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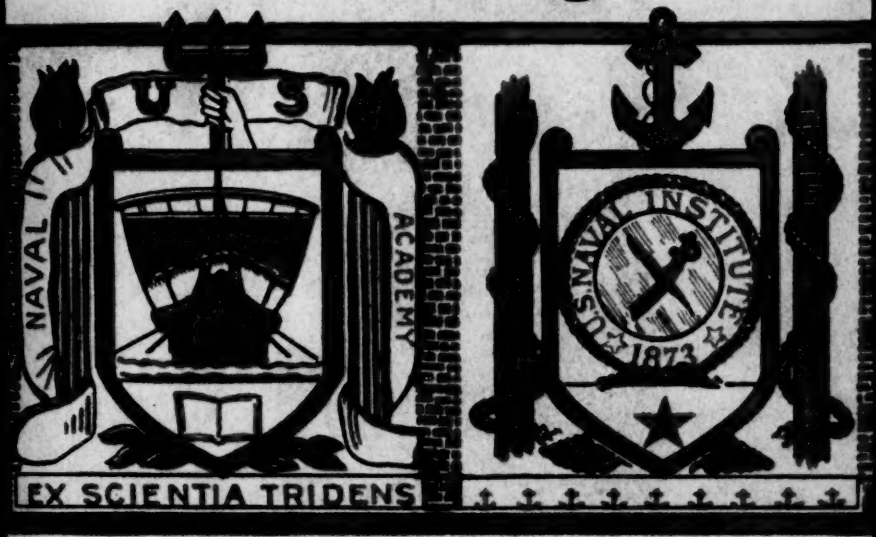

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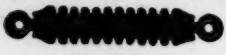
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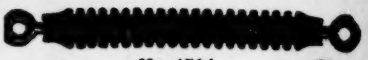
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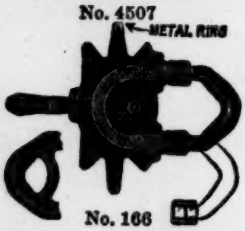

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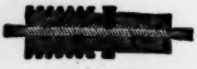
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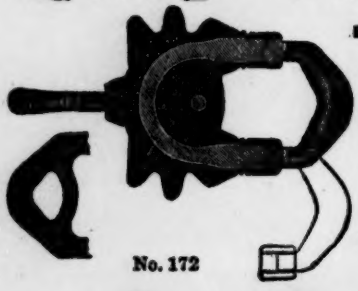
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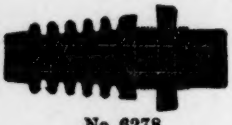
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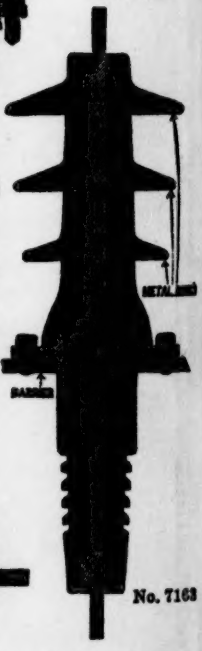

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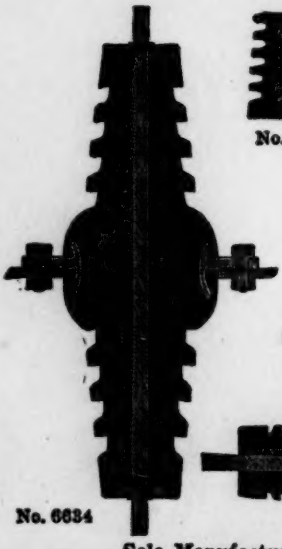
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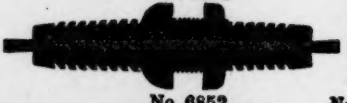
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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A MIDSHIPMAN ON THE *MAINE*

By Commander W. T. Cluverius, U. S. Navy

FOREWORD

This is a midshipman's story of the ill-fated *Maine*. It was written on the Santiago Blockade during the Spanish-American War and only a few months after the ship's destruction. His record has come to light from the bottom of a chest of old papers and he wrote as he felt, while the scenes were yet fresh in his mind's eye. The good ship and her stalwart crew have never been forgotten in the navy even though the twentieth anniversary of that dread night is now at hand.

The North Atlantic fleet had arrived at anchor off Dry Tortugas on a delightful January evening, when the commanding officer of the battleship *Maine* received orders to proceed with his command to the city of Havana.

At last, after a month of false alarms and tiresome lingerings in southern waters, an American warship was starting for Cuba.

Some of us aboard considered it our good fortune, and others, while glad of the change, felt many misgivings within. We had been waiting since October, when, with hurry-up orders, we were sent to Port Royal, in South Carolina; then, after six weeks, a change of orders took us to the Norfolk Yard for Thanksgiving; and, finally, we hastened to Key West, there to remain until the fleet came South, whiling away the time in pursuit of filibusters and mosquitoes—both giving us much trouble.

Howbeit, January 25 dawned "clear and pleasant," and on the starboard bow stretched the deep blue line of the Cuban coast.

Steaming very slowly, every preparation was made for any possible emergency. The question was: Had or had not the consul-general asked for a warship?

The main and secondary batteries were supplied with ammunition, the guns themselves carefully examined and put in the best shape; rifles were brought from the armory, rifle belts filled with cartridges; the necessaries for a landing force gotten in readiness. When still well outside the Morro, we went to general quarters.

American vessels were not usually taken unawares. We approached from the westward, the pilot boarded us, and slowly the good ship *Maine* entered the narrow channel—the first naval vessel to do so since the outbreak of the prevailing struggle for Cuban freedom.

On the starboard hand, La Punta battery displayed its antique artillery, and beyond towered the Castillo de Principe. On the port hand was the Morro, imposing in its ancientness, built up from the jagged rock on whose extremity stands the lighthouse which marks the entrance. Far up on the battlements floated the yellow and red of Spain. On past the Morro, along the heights, stood the fortress of Cabañas, the lodgment of those Americans who had persisted in the art of filibustering and whose efforts had not met with success at Spanish hands. Just below Cabañas, on the hillside, was the laurel grove where doomed insurgents were shot; and further down, on the water's edge, was the town of the Casa Blanca, where colliers were being unloaded from piers.

Passing by the large German frigate *Gneisenau,* lying at anchor, the *Maine* arrived, without event, at the mooring buoy designated by the captain of the port. This was a government buoy—No. 3—placed just off the Machina de San Ferdinand, the naval station. At another one of the buoys, the next to the northward, lay the *Alfonso XII,* a cruiser, the flagship of Rear Admiral Manterola.

At 10, the port was saluted and Cabañas returned the salute. Then we saluted the Spanish admiral and the *Alfonso* answered. A boarding officer shortly afterwards made the usual visit to us. Crowds of people lined the wharves along the entire city front, house tops were full, and the boatmen were doing the best business of the season.

Spaniards and Cubans are not naturally quiet, and the noise of the jabbering—the term seems justifiable—was plainly heard on our quarter-deck. The harbor was crowded with vessels. Across the way, off Regla, were the liners taking cargo from lighters; up

the harbor a bit were two or three small gunboats. Near Casa Blanca was moored the large dry-dock brought from England. At the docks were the transports loading with troops for other points on the island.

No doubt the coming of the *Maine* had created a stir and set all the tongues of the populace going.

"So that's the best ship in the Yankee navy!" said one sneeringly.

"Why," remarked another of the loyal worthies on the docks, "put her on the quarter-deck of the *Carlos V* and you couldn't find her."

"If the *Palayo* ever got after her!" exclaimed a third. The Cubans, though, felt proud of the arrival of the *Maine* and took the meaning of it to themselves.

An officer was sent to call on General Lee reporting the arrival and, also, that the salutes had been exchanged and the official visits made.

I chanced to be the one sent to the consulate, and was put ashore at the Machina. At the gates to the street were throngs of people peering through at the American boat. Followed by a crowd of urchins and idlers I reached the Casa Nueva, in which are located both our own and the British consulates. The general received me and seemed much surprised at our early arrival. I could see that he did not expect a ship—at least, not just then.

"Was there any disturbance on your way in?" he asked. "None," said I. Again he looked surprised, and arranging the hour for Captain Sigsbee's visit I withdrew. With the same band of followers, augmented, perhaps, by a few more negroes, my *cabriolé* soon reached the Machina where the boat awaited me.

Not until after all the official visits were made, were the officers allowed to go ashore. Captain Sigsbee and his aid, Midshipman Holden, called on the admiral at his residence in the Machina; then on the acting captain-general of the island, General Parrado. Blanco, at that time, was in the Province of Santa Clara attempting to buy over the Cuban leaders in the east.

General Parrado received the captain with much courtesy and promised to return the call next day. What with all these official obligations devolving upon Captain Sigsbee, it was some time before he found himself able to pay his respects to that august body of the Cuba-Española, the Autonomist Cabinet, whose dignity

was considerably ruffled when the American naval officer failed to do homage the very first hour of his arrival!

The second day in port, during the forenoon, General Lee —jovial as always—came on board with a party of Americans and Cubans, and a cordial greeting followed. The next day, General Parrado and staff arrived alongside in the official launch. They were received by the captain and officers, and the marine guard was paraded. General Lee accompanied the party, his civilian clothing forming a great contrast to the gaudy array of the Spanish staff-officers. Not one single uniform matched another. Some wore red coats, light blue trousers with green stripes; some, blue coats, red trousers with black stripes; others wore green coats, red trousers with blue stripes—for all the world like the "soldiers-so-brave" in the comic opera of the period.

The acting captain-general, seemingly a very able man, inspected the ship from top to bottom. Some of his officers looked rather dubious, when, at the entrance of the long armor-passage, we desired them to pass through.

There was no telling what those Americans would not do.

Parrado was much pleased with the *Maine* and expressed his satisfaction the following day by presenting the officers' messes with the best sherry his cellars contained.

Soon the visiting populace began to pour in upon us, from the early forenoon until dark every day. Large parties of Cubans—pretty girls, enthusiastic young men, scolding duennas, and crying children—crowded aboard. And all the while Spanish boatmen, struggling for the gangway, made such a hubbub, that the sentry's order to "move off" or "get out of that" was not heeded. These fellows would hang on to the boats at the booms, to the pendants, to the ash-chute, to ring-bolts anywhere to be able to keep from pulling one whit more than absolutely necessary. The bluejackets enjoyed it all hugely, and, as only one or two spoke Spanish, those acting as guides used the sign language mingled with sea-going terms and strong English expressions. A party would gather around one as he opened the breech of a six-inch gun. He would go through the acts of loading, training, and aiming, then the meaning would dawn on the audience and a "Si! Si! Si!" was passed around, and the entire party would put on a broad smile of admiration as the demonstrator took a fresh chew.

No visitors were allowed below the main-deck unless accompanied by one of the crew detailed by the officer of the deck. This rule was strictly enforced at all times. The chief master-at-arms, with his assistants and the marine sentries kept a constant patrol on the berth-deck and below. Now and then a Spanish officer was seen amongst the visitors, and sometimes a group of soldiers appeared; but they, poor unfortunates, did not know a turret from a capstan.

From time to time we saw the big transatlantic transports come in laden with raw troops, most of them mere boys. Then the city went wild, rockets fired, flags flying, ferry-boats leaving their route and circling around the steamers for hours, with brass bands hammering out "Cadiz" over and over, and the passengers yelling themselves hoarse with cries of "Viva Cuba-España!—Viva La Autonomiste!" Later on the troops would be removed, some sent to the front at once, some to Cabañas, and others to the arsenal up the harbor.

Another German vessel arrived—the *Charlotte*—and anchored near by. Soon the French flagship *Dubordieu* came in and anchored near us, making a very pleasant neighbor.

Shore leave was granted the officers a few days after our arrival and we were ordered to wear civilians' dress ashore at all times. Popular feeling, we soon found, was decidedly against us and against the maintenance of an American warship in the harbor of Havana. The Cubans, whose acquaintance we had made on board, extended hospitalities, and regretted very much their inability to entertain us as they wished, through fear of the annoyances and friction this would cause with the authorities. In other words, to be seen publicly with an officer of the American navy, meant to be marked as an insurgent sympathizer.

Of course, we met many Cuban-Americans. The majority were delightful, polished persons. Others were American in name only, and had but little contact with our own people and our own customs. The greater bulk of the populace were Cubans. The Spanish troops—a very transient portion of the inhabitants—in and about the city were numbered by the thousands. There were officers everywhere.

The cabmen, the boatmen, the public servants, the hotel employees, and above all, the shopmen, were Spaniards. The Cubans we met were for the most part property owners, and, before the

war, maintained their large sugar estates, so lived in a certain amount of luxury. The effects of the war on their interests were, first, to compel them to pay a heavier tax to the Spanish Government; and, besides, to make a like compensation to the insurgents to be allowed to grind their own cane. Finally, the Cuban estates were closed entirely, many of them burned, so that the only plantations doing a profitable business in the Island of Cuba were those controlled by American interests.

The representative Cubans—I mean those upon whom the duties of governing free Cuba ought by right devolve—directly and indirectly helped the insurgent cause. There were members of the best families in arms throughout the island. Yet, I have heard many Cubans say—some of their best minds too—that annexation to the United States would be the only solution of the problem, the only means of securing the permanent welfare of the people at large.

These, our friends, while they rejoiced to see the *Maine* at anchor off the city, often told us that they were not entirely at ease as regards our safety in those waters. Spanish treachery to them was an every-day affair. They saw it in the every act of the Spaniard, and naturally apprehensions for our well-being arose.

The greatest element of disturbance in Havana society was the Spanish soldier. Should you chance to join that great throng of promenaders in the Parque Central, as the band played about the base of the statue of Isabella La Catolica, your first thought would be—Where did all those Spanish officers come from? They outnumbered the civilians, and, in their comfortable colonial uniform, took possession of the promenade. One rarely saw a Cuban girl in these gatherings at that time.

The Spanish naval officer was more or less countenanced by the Cubans and was often received in their homes. Those I met were bright, courteous people. Yet even as the officers of the army were not obliged to remain with their troops in the various garrisons about the city, no more were the officers of the navy compelled to live altogether aboard ship. Their naval academy training profited them little, it seems, especially on the Cuban station. Drills and maneuvers were unknown; target practice, something they read of. Their vessels deteriorated because the funds for repairs never got as far as the ships themselves. In fact, the *Alfonso XII*, the flagship, had not been able to move

under her own steam for one year before the *Maine* came, because almost every boiler-tube had gone—rusted and useless.

Then the troops, a miserable lot of recruits they were, landed from a transport one day, sent to the front the next, marching back and forth, through swamps and morasses, living in filth, one meal a day out of a common trough, fallen upon suddenly by insurgent bands, finally brought back, burning up with fever, to hospitals, which the majority of them never left again. And yet few deserted to the enemy. Unquestionably, the Spanish soldier who fought the insurgents in Cuba deserves this much credit, that he remained loyal, despite unceasing cruelty and suffering which few would have endured.

There were several thousand volunteer troops in the city consisting of the shop-keepers, clerks, waiters, and loyal Cubans. Certain battalions were inspected each morning on the Prado. They carried their rifles as farmers would hay-rakes. An imposing spectacle they presented at dress-parade. The authorities had tried repeatedly to send them to the front. But they declared emphatically, one and all, that, primarily, they were the home guard. I noticed that their posts were principally in charge of the soup-houses for the *reconcentrados;* so, no doubt, they had a strong political pull.

The military police in the city were picked troops, and, as a rule, were very fair specimens of the soldier. There were also the civil police, with whom every cabman and street vender had the privilege of discussing any orders given them.

In all, then, Havana was in a state of unquiet when the *Maine* arrived on the scene. The government was doing all it could to draw the minds of the people from the war. Mazzantini—the greatest living matador—was engaged for seven *corridas* at the Plaza de Toro, across the harbor in Regla. He was paid $30,000 for his endeavors to divert the distracted thoughts of the Havanese. Anonymous posters and incendiary circulars were scattered broadcast throughout the city. Some said the Autonomists were responsible for them. Several reached the *Maine*. One of them denounced the Yankee pigs in strongest terms; another upbraided the loyal citizens for tolerating the presence of an American warship in their beloved waters—could this be called Spain with honor?

The crowds returning on the ferry-boats from the bull fights would shout "Viva España," as they passed the *Maine*. In fact,

one brave boat load went so far as to cry out "Down with the Americans!"

The days went by rapidly. General Blanco returned to the city and Captain Sigsbee called—the call was not returned. We made excursions in and about the city, saw the troops coming and going, took bicycle tours through the suburban towns, down to Mariano Beach, out to the ball games at Védado. Yet, we never felt exactly at home. At the hotels, the Spanish and French officers were always shown preference. Often the cabmen would refuse to accept an American "fare." The French officers were tendered a large reception and ball; we were not invited. The greatest attention we received was shown us by the professional beggars and the *reconcentrados*—the latter fast developing into the former. In January, 29 of these unfortunates, driven into the city by both Spaniard and insurgent, died of starvation in the streets. That was the smallest number recorded in any one month. Since the outbreak of the war, the population of Cuba had been reduced 400,000—killed, died, or disappeared.

During the first week of February, Aranguren, a dashing insurgent leader, was betrayed, and a hundred Spanish troops were sent to take him. So they did—dead. From the consequent celebration and general jollification one would think that the insurrection had been quelled.

A few days later, a rumor was rife aboard ship that the *Maine* was to attend the carnival at New Orleans. The next day, we found that there were no orders to that effect. On the 12th, the *Dubordieu* left for the carnival, the Germans having sailed some time before. On the 13th, Sunday, a report was made of the rough drawing which had been discovered on the wall of a house in the city depicting the destruction of a battleship.

It has been mentioned above that the *Maine* was constantly prepared. The ordinary anchor-watch at night was supplemented by a regular quarter-watch, ready to jump to the guns at a moment's notice. Additional sentries were posted forward and aft, and, no boat, whether passing or coming alongside, escaped the challenge from our decks.

Tuesday, February 15, the last day of our good ship's life, arrived. It was a beautiful day, with a gentle northeast breeze blowing and the harbor full of craft. The coasting steamers at the docks, I remember, were getting cavalry troops on board, and as they were loaded, hauled out in the stream. I had the watch

from four to eight in the evening. Nothing of event occurred. I noticed that the wind had shifted to the northward, and the ship swung to that point; for we always rode head to wind there. Only once during our three weeks' stay had we headed in that direction.

At eight Lieutenant Blandin relieved me, as midshipmen stood the day watches only. The customary eight o'clock reports were made as usual; the night watch was mustered, ready to go on at nine o'clock. The men were dancing in the starboard gangway to an accordion's music. One of the gunners' mates was playing a mandolin in the after turret. We were accustomed to turning in early, and by nine o'clock when "pipe-down" went, several of the officers were already asleep. Many of us in the junior officers' quarters were getting letters ready for the morrow's mail. At three bells I was still writing, with but little clothing on—for it was very warm between decks.

The letter finished I was sealing it, when suddenly a report—the firing of a gun it seemed—startled me, followed at once as it was, by an indescribable roar, a terrific crash, intense darkness, and the deck giving away beneath. Out in the mess room, I groped my way, and found Bronson, a class-mate. "Come on," said he, "we'll make it," and in the passageway where the water was now ankle deep, we felt a draft of air from the forward end where once ship had been was now open to the sea. We made for the junior officers' hatch. We found it blocked by wreckage. One exit closed, though several near us were attempting to get up that way. Around the engine-room hatch, down which the water poured, we two picked our way aft, up what had been the ladder of the ward-room hatch, out through the cabin passageway and climbing the outside of the after superstructure found ourselves on the poop, safe. All the officers (save two) and a few of the men on watch, fortunately aft, had reached this, the only place of safety. The poor wretches, pinned down and drowning, mangled and torn, screamed in agony. A crew of officers and men jumped into the only boat left—the captain's gig—and pulled forward. The *Alfonso's* boats arrived, then came those from the Ward liner *City of Washington,* which had just come in from New York. The fire in the upheaved mass began to burn fiercely. Officers climbed forward on the debris, over the quarter-deck to lend assistance; they could do nothing there, everything had gone. The work of rescuing was progressing rapidly. One Spanish boat alone saved two-score men.

"Captain, we had better leave her," said Lieutenant Commander Wainwright, the executive officer, as the water washed the poop and the wreck sank deeper in the harbor ooze.

"Get into the boats, gentlemen," Captain Sigsbee said to us, quietly and sadly.

A muster of the survivors was made about a quarter after ten. Lieutenant Jenkins and Ensign Merritt were missing and more than 200 of the crew. Subsequent musters from the hospitals, from the vessels in the harbor, and from private houses throughout the city, up to the last recovery of a body, the latter part of March, showed that 260 lives had been sacrificed in a crew of 328 all told. Our wounded were given the best wards in the hospitals. Everything possible was done for them. Some lingered a few days in great suffering, many died the next morning.

The Spanish authorities took charge of the wreck at once, allowing no one near it. In the morning the *Mangrove* came in, followed by the *Fern,* two fleet tenders. That afternoon, the steamer *Olivette,* of the Plant line, took the survivors to Key West, with the exception of a few of the officers, detailed for duty with the wreck, who were to remain with Captain Sigsbee. We had contrived to get some clothing, for many of us had none. We then went to the Hotel Inglaterra, in which we made our quarters.

On Thursday, there was the public funeral of the bodies recovered at that time—only seventeen. It was a beautiful spectacle. First the marines, then the seaman battalion from the *Alfonso.* Behind them came the military, naval, and civil authorities; then, the long line of richly draped hearses. Following these, rode the officers of the *Maine* in carriages. Behind us marched the fire department in full force; then the civilians on foot; while hundreds of carriages brought up the rear. A sorrowful band we were, following our dead shipmates to their graves in foreign soil. For the Spaniards, however, it seemed, somehow, more of a gala-day festival. The streets were lined with spectators, and the police attended to duty so poorly, that the thoroughfares were often blocked.

The cemetery of Cristobal Colon is a beautiful spot outside the city, and there more than a hundred of the crew lie peaceful and undisturbed.

Our thoughts turned again to the wreck and next morning, Friday, Captain Sigsbee in one of the *Fern's* boats attempted to approach it; but the patrol boats would not allow this, as they

had other orders. This caused the delay of a day until we could be furnished with passes—the seal of the *Alfonso XII.* Permission was granted to hoist the American colors on the wreck; but as the order was not sent from headquarters, this also was not allowed by the officer in charge. Several hours were consumed in obtaining the order. The authorities would do anything for us—*mañana.*

The navy divers arrived from Key West and were idle at first. They must be accompanied in their work by Spanish divers, so said the authorities. Captain Sigsbee would not accede to this and an appeal to Washington changed the Spanish mind.

The next order that came from the palace stated that at least one Spanish diver must be present on the wreck when operations were going on, and that in no case was an American diver to go *outside* the ship. The claim of its being American territory was made at once. "*Inside,* yes, but not *outside,*" replied the Spaniards. It took some time to have this changed from Washington and, finally, our divers went where they pleased.

Meanwhile, the wrecking outfit arrived. First came the *Right Arm,* then the *Merritt* with the big barge *Sharp,* and, finally, the derrick *Chief.* The work of rescuing bodies was the first consideration, and, as they were recovered, our devoted Chaplain Chidwick took charge of them. The court of inquiry arrived on the *Mangrove* and began its first session. The *Montgomery* came in and Captain Sigsbee took up his quarters on board. The *Bache* made frequent trips with the convalescent and took several bodies home for burial.

One morning when we reached the water-front, we found every craft in sight covered with flags and banners, and later, amid deafening noises of bands and bombs and the cheers from the thousands, the Spanish cruiser *Vizcaya* entered the harbor from New York. She was followed, the next day, by her sister ship, the *Almirante Oquendo.* Rumors of war began to come in, yet the wrecking operations still went on. The court of inquiry left for Key West for a session and once more returned. After a time, Spanish authorities bethought them of a similar court, and very politely asked if their divers could go down. This was allowed them by the consul-general with the stipulation that they remain *outside* the wreck; for *inside,* they were informed, was *American* territory. There it stood. Nor did they ever go down within the wreck, and very little Spanish diving went on when the officer in

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charge of it was not about. A large number of unexploded shell were recovered, several six pounders, and four of the 6-inch guns. There was not much else. The forward turret was never located; the after turret was on the bottom, still intact. The wrecking master and the dynamite expert showed that dynamite was absolutely necessary to recover the after 10-inch guns. The authorities were consulted. They were asked to allow the importation of 200 pounds of the explosive to be stored in their own keeping. This was not granted, the Spaniards claiming that their court of inquiry was not nearly through its work; and it was intimated that Captain Sigsbee wished to change the face of the wreck, and so destroy the evidences of an internal explosion. All knew what the conclusion of the Spanish court would be.

Internal explosion, indeed, when every sign, from the external pressure on exploded powder tanks to the double-bottom framing thrown up to the surface of the water, plainly indicated, that, whatever the cause had been, it was certainly foreign to the ship. Finally, our court completed its work and went home, while we awaited results.

The *Vizcaya* and the *Oquendo* sailed with secret orders. The Austrian cruiser *Donau* came in from New Orleans, and the Italian *Amerigo Vespucci* soon followed.

The newspaper men were getting nervous, rumor was rife, the Spaniards were uneasy. So were we. When would war be declared? was the question now.

"Of course we want war," said a Spanish army officer. "We know the result, still how can we lose Cuba more honorably?"

Americans were going home. Every outbound steamer was crowded. Cubans as well were leaving. Finally, a despatch ordered every officer home except Lieutenant Commander Wainwright. This was the 25th of March. Happy were we indeed—and I know Captain Sigsbee was glad to go, too, when the *Olivette* steamed out from the Morro and turned her nose northward across the Straits. How delicious was our first breath of fresh sea air after having been pent up so long in those filthy waters.

On April 6, the wrecking operations ceased and all concerned went home. The sequel is a well-known story, and as one contemplates the glorious victories of the American arms, ashore and afloat, one must surely feel that the lives of those seamen lost in Havana Harbor were not lost in vain.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

CAPTAIN WEIR'S AZIMUTH DIAGRAM

By LIEUTENANT E. R. McCLUNG, U. S. Navy

Captain Weir's azimuth diagram as furnished to ships bears an explanation of only one of the several solutions of the astronomical triangle which can be performed with more facility by using this diagram than by any other method. Directions for solving problems in addition to the usual one of simply finding the azimuth where latitude, declination and hour angle are known are here printed in condensed form, with a view to removing the page, and, after cutting it in two pieces, pasting these pieces on the blank margin of the diagram. Any doubt as to the theory and method involved in these solutions will be removed by consulting the references to Muir and U. S. NAVAL INSTITUTE PROCEEDINGS.

No explanation of the proper sign to choose is here attempted as this will be made clear only by practice. Therefore, it is well to solve a sample problem under each case, assuming the same values for all, so that the results will, themselves, be a check on the work.

The cases are numbered with reference to the case already explained on the diagram as Case I. The following small table offers a ready means of selecting the known and unknown quantities and should also be cut out and pasted on a blank space of the diagram. Subscripts *a* and *t* indicate arc and time respectively, and the quantity in parentheses is the one to be found by the solution.

Use as	Case I	Case II	Case IIIa	Case IIIb	Case IVa	Case IVb
Hour Angle...	t	ta	(ta)	t	$\lambda 2 - \lambda 1 t$	Ct
Latitude.....	L	L	L	L	$L1$	L'
Declination....	d	(h)	h	(d)	$L2$	(D)
Azimuth.....	(Z)	Zt	Zt	Z	(C)	$\lambda 2 - \lambda 1$

DIRECTIONS FOR SOLVING ADDITIONAL PROBLEMS BY WEIR'S DIAGRAM

(See Muir, 1911, Appendix C, page 756, and U. S. NAVAL INSTITUTE PROCEEDINGS, December, 1908, page 1253.)

In all solutions reckon azimuth from elevated pole.

Case II.—Given L, d and t to find h and Z (to predict position of body, particularly a star). Find Z in usual manner by Case I, then convert Z into time and consider as an hour angle. Convert t into arc and consider as an azimuth. Use given latitude as latitude, and on declination scale read off true altitude, h.

Case III.—Given L, Z and h to find t and d (for star identification).

(a) Convert azimuth into time and consider as an hour angle. Use given latitude as latitude. Consider altitude as declination. On horizon circle read off body's H. A., expressed in arc and converted into time.

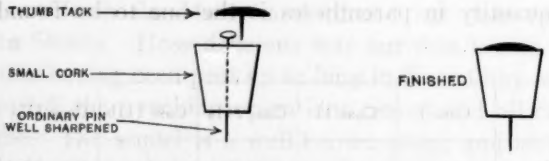
(b) Use known values of latitude, azimuth and hour angle as such and work backward to obtain declination.

Case IV.—(a) To find course to destination: Use latitude of place of departure as latitude. Consider difference of longitude converted into time as hour angle. Consider latitude of destination as declination, and on horizon circle read off Z—initial course required.

(b) To find distance to destination: Use latitude of place of departure as latitude. Consider difference of longitude as azimuth. Consider course converted into time as hour angle. Then on declination scale read off D, and distance to destination $= 90° = D$. Reduce this value to minutes of arc = nautical miles.

The following hints will make the use of the diagram very easy and convenient:

Make a number of pins after this fashion



Place new numerals along horizon circle as follows:

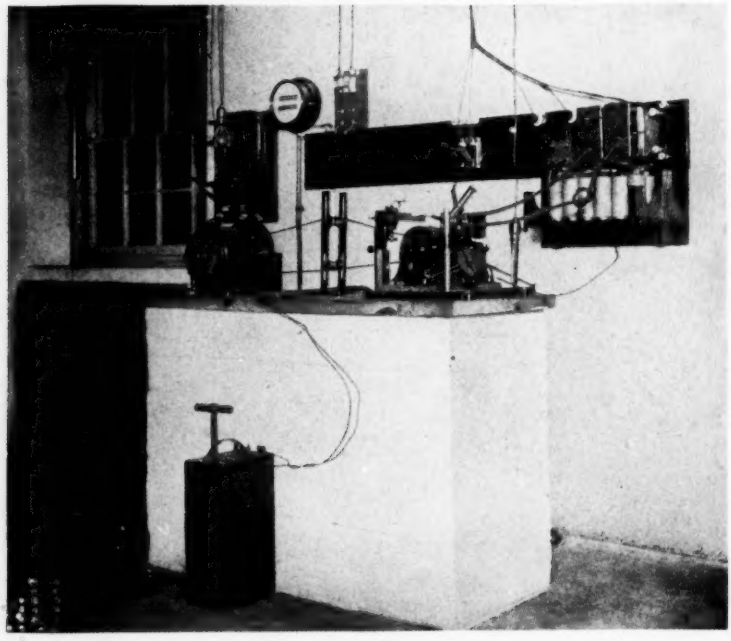
From equator (90°) to south pole, add, in red ink, numerals from 90 to 180, at every fifth graduation opposite to black numerals running from 90 down to 0, thus:

90°	....
85°	95°
80°	100°
75°	105°
etc.	etc.

From north pole to 105° and from south pole to 75°, place in black ink at each fifth division the value of hour angle equivalent to the degrees of arc, thus:

H. A.	Arc
0	0°
0:20	5°
0:40	10°
1:00	15°
1:20	20°
1:40	25°
2:00	30°
etc.	etc.

Each degree on the horizon scale being equal to four minutes of time, with these new numerals to aid the eye, time can be converted into arc, and the reverse operation performed, instantly.



METTEGANG RECORDER.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A STUDY OF THE RATE OF DETONATION APPARATUS OF THE U. S. BUREAU OF MINES (METTEGANG'S RECORDER)

By RUSSELL B. MUNROE

WITH SUPPLEMENTARY REPORT

By A. J. STRANE[1]

At the Fifth International Congress of Applied Chemistry at Berlin, Dr. Mettegang described[2] a recording instrument of his invention for use in determining the rate of detonation in explosives. This instrument met with such approval that when, in 1908, the testing station of the Bureau of Mines at Pittsburgh was created, Dr. Holmes installed there one of Mettegang's recorders which has been in use ever since.

As the Mettegang recorder at Pittsburgh differs in details of construction from that described in the Reports of the Berlin Congress and in other publications, it may be well to preface this article with a description of the Pittsburgh instrument and its use, as given on pages 92 to 95 of Bulletin No. 15 of the Bureau of Mines.

Provided all other conditions remain the same, the shattering effect of an explosive varies with the velocity with which the explosion wave or explosive reaction travels through the charge of the explosive. In explosives fired by detonation this movement as measured in definite terms of time and length is styled the rate of detonation.

In every explosion, however initiated, the cross-sectional area that the exposed surface of the explosive immediately presents to the exciting cause or agent, is a most important factor in determining the final effect. In all of the tests of detonating explosives that have been made at the Pittsburgh testing station, mercuric fulminate, or a mixture of this substance with potassium chlorate alone or with other substances, has been

[1] Published by permission of the Director of the Bureau of Mines.

[2] Messung der Detonationsgeschwindigkeit von Sprengstoffen, Rept. of Berlin Congress, Vol. II, pp. 322-328, Berlin, 1904.

used in electric detonators as the exciting cause. To assure the exposure of a definite and uniform area of the explosive to the action of the electric detonator the explosive is placed in tubes of thin sheet iron, 42 inches (107 centimeters) in length and 1½ or 2 inches (3.8 or 5.1 centimeters) in diameter. The variations in the diameter of the iron tubes used are permitted in order to meet the requirements of the different explosives to be tested and to allow for the different diameter of the cartridges in which they are furnished for use in blasting.

When the tube has been charged with the desired amount of the explosive to be tested, two copper wires are inserted through perforations in the tube and cartridge file, at a distance of 1 meter apart, so that the column of explosive between these wires is 1 meter long. The copper wires are each led to a recording chronograph. A No. 7 electric detonator is inserted in the tube, in one end of the column of explosive. The tube with its contents is then suspended in the firing chamber, the copper wires are connected up to the recording chronograph, and the electric detonator, which has been connected to a dynamo electric machine, is fired. Of the two copper wires passed through the tube, the one that is nearest the electric detonator is ruptured first. As the explosion wave proceeds through the column of explosive the second wire is eventually reached and ruptured. The time which elapses between the rupturing of the first and second wire measures the rate at which the detonation proceeds through the column of explosive.

The time which intervenes between the rupturing of the first wire by the explosion of the electric detonator and the rupturing of the second wire by the detonation of the last layer of explosive at 1 meter's distance from the first wire is measured by means of the Mettegang recorder shown in the plate given herewith.

The primary components of the Mettegang recorder are a soot-covered bronze drum so connected to an electric motor that it may be caused to revolve at any desired speed up to 105 revolutions per second; a 220-volt direct-current motor provided with a rheostat for controlling its speed; a vibration tachometer so connected to the bronze drum that the number of revolutions of the latter in unit of time are accurately measured for any speed between 50 and 105 revolutions per second; induction coils, the primaries of which receive their current from an electric-lighting circuit having a terminal pressure of 220 volts, and platinum terminals placed about .25 millimeter (.01 inch) from the surface of the rotating drum and in circuit with the secondaries of the induction coils, by means of which electric sparks are so projected against the surface of the drum as to disturb its sooty covering and produce tiny bright spots at the point of impact. These spots may be easily perceived by the aid of a microscope attached to the recorder.

The drum is 500 millimeter (19.69 inches) in circumference. The edge of this drum is provided with 500 teeth which may be made to engage an endless screw. A pointer attached to this screw passes over a dial reading to hundredths, thus indicating with great precision the distance intervening between the spots produced on the soot-covered surface of the drum. The

drum is provided with six platinum terminals held by an insulated arm that may be so moved as to bring the points within any desired distance from the drum. Each one of these points may be put in series with one of the secondaries of the induction coils, while the other end of the electric lead is grounded to the drum through the base which supports it. Only two of the platinum terminals are used in any single firing trial for the determination of the rate of detonation in a given explosive; the other four are held in reserve for future use.

In ascertaining by this method the rate at which detonation once initiated is transmitted through a column or file of an explosive, the electric current used as the medium for transmitting the record is divided into two parts by passing it through two equal lamp resistances each of which, at the Pittsburgh testing station, consists of a series of from 5 to 20 16-candle-power lamps. After independently traversing the cartridge file at the initial and final points, the two leads are jointly connected to one of the poles of the primary of the induction coil through which the current passes to the return conductor. The secondary of the induction coil is then connected by one pole to the two platinum terminals and by the other pole to the base supporting the drum as described. In the induction coil, as is well known, any change of tension in the primary coil sets up an induced current in the secondary coil, and this mutual induction between the coils results in the production of a higher potential difference at the terminals of the secondary coil, so that sparks of considerable length and intensity may be obtained. In the earlier part of the work at the Pittsburgh testing station circumstances were such that coils provided with iron cores were used, and all the data for rate of detonation test recorded in this bulletin were obtained with iron-cored coils. By a readjustment of the apparatus, induction coils without iron cores were made to give the desired kind of sparks, and such coils have been used in all subsequent tests made at the station.

The vibration tachometer, by which the speed of rotation of the drum is measured, is connected to an auxiliary shaft that engages the main shaft of the drum by gears, thus preventing any irregularity in recording the speed due to slipping. This tachometer measures the number of rotations of the drum, but, as the circumference of the drum is accurately known, the distance per second which any point on the periphery travels may easily be calculated. Hence, at the highest speed of 105 revolutions per second, the distance of travel is 52.5 meters (172.2 feet) per second. At 50 revolutions it is 25 meters (82 feet) per second. At 86 revolutions, the number commonly used in the tests at the station, it is 43 meters (141 feet) per second.

The distance between the spots impressed on the surface of the drum are, as has been previously intimated, accurately measured by means of the filar eyepiece and the endless screw, the spots being focused on the cross hairs of the eyepiece.

The iron tube containing the cartridge file is suspended in the chamber and the explosive is fired. This chamber is a circular pit that was formerly used as the well of a gasometer. In adapting the pit to its new use the top of the gasometer was cut off and placed at the bottom of the pit on a bed

of sawdust, and the space between the gasometer and masonry walls of the pit was filled with sawdust. The cover of the pit consists of heavy timbers framed together and overlain with 12 inches (30.5 centimeters) of concrete reinforced by six I-beams. Four straps extend over the top and down to eight "dead men" planted about 8 feet (2.44 meters) below the surface of the ground. The pit is 16 feet (4.88 meters) in diameter and 11 feet (3.35 meters) deep. A manhole in its cover provided an entrance to the interior.

METHOD OF CONDUCTING TEST

The rate of detonation is measured through a cartridge file 42 inches (107 centimeters) in length. In making a test the separate cartridges, having the paper cut from their ends to avoid the damping effect to its folds, are placed end to end in a sheet-iron tube 42 inches (107 centimeters) long and either 1½ or 2 inches (3.8 or 5.1 centimeters) in diameter, depending upon the diameter of the cartridges used. Two copper wires leading from the Mettegang recorder are passed 1 meter (3.28 feet) apart through the cartridge file and firmly secured. The charge thus arranged is suspended horizontally in the pit and exploded by an electric detonator placed in one end of the cartridge file. The drum of the Mettegang recorder is rotated at the desired speed, and the electric detonator is fired by an electric firing device placed near the recorder. As the wires that pass through the cartridge files are broken, spots are formed on the drum, the distance between the spots at a constant speed of the drum being proportional to the time elapsing between the breaking of the wires. When the peripheral speed of the drum is 43 meters (141 feet) per second, the smallest time interval which it is possible to measure is $\frac{1}{4,300,000}$ part of a second, although with the distance between wires equal to 1 meter (3.28 feet) such refinement is not necessary.

All high explosives are tested in cartridges having a diameter of 1¼ inches (3.2 centimeters). If an explosive with this diameter fails to detonate completely, cartridges having a diameter of 1¾ inches (4.4 centimeters) are used. If an explosive should fail to detonate completely with 1¾ inch (4.4 centimeter) cartridges it is considered unsatisfactory and is not eligible for the permissible list.

If the explosive submitted for tests is not in cartridges of 1¼ inch (3.2 centimeter) diameter, it is repacked, care being taken that the specific gravity as determined in the physical examination has not been altered.

The rate of detonation, which is expressed in meters per second, is computed from the speed of the drum and the distance between the spark points, as illustrated in the following example:

In the test of Carbonite No. 1 on March 20, 1909, the speed of the drum was 43,000 millimeters per second and the distance between spark spots 12.63 millimeters. Therefore, 43,000 millimeters were traversed in one second, 1 millimeter in $\frac{1}{43,000}$ seconds, and 12.63 millimeters in $\frac{12.63}{43,000}$ seconds. Hence, $\frac{12.63}{43,000}$ seconds is the detonation time for a 1-meter length of the

explosive, and one second is the detonation time for $\frac{43,000}{12.63}$ meters, or a 3405-meter length of the explosive.

THE TESTS

This study was undertaken to determine the maximum variation in the calibration of the Mettegang recorder and how best to reduce this variation to a minimum.

The machine was first put in adjustment. That is, all of the spark points were brought into line with regard to their distances from the drum, and the arm carrying them was adjusted so that their travel across the drum was parallel with its surface. To adjust the points, the drum was first coated with soot and one needle adjusted to just touch the drum, as indicated by a scratch produced in but not through the soot on the rotating drum. The arm carrying the points was then adjusted so that the point would just scratch the drum completely across its face when the arm was run back and forth. The other points were then screwed down until they just marked the drum when it was rotated. The graduation on the graduated screw controlling the vertical movement of the arm was noted and called the zero point. The points were then raised .22 millimeters and ten shots fired with the drum standing still (Table I).

TABLE I

Electric Detonator M. 1806 A. Spark Gap, .22 mm. R. P. S., 0

Trial	1	2	3	4	5	6	7	8	9	10	Aver.	Max. Var.
1–2...	3.92	3.64	3.90	4.31	4.12	3.84	3.70	3.78	3.83	3.55	3.86	.67
1–3...	4.06	3.84	4.04	3.97	4.12	4.00	3.83	4.14	4.03	3.87	3.99	.21
1–4...	4.15	3.77	4.04	4.15	4.19	4.14	3.98	4.05	4.03	3.71	4.02	.41
2–3...	.14	.20	.14	—.34	.00	.16	.13	.36	.20	.32	.13	.70
2–4...	.23	.13	.14	—.16	.07	.30	.28	.27	.19	.16	.16	.46
3–4...	.09	—.07	.00	.18	.07	.14	.15	—.09	—.01	—.16	.03	.34

After these 10 shots had been fired, two shots each were fired with the points .44, .66 and .88 millimeters from the drum. The variation in distance between the craters was not noted, but the effect of sparking distance upon the shape of the spark crater was observed.

A set of three readings was then made with the drum running 90 revolutions per second and a spark gap of .22 millimeters (Table II).

TABLE II

E. D. M. 1806 A. Spark Gap, .22 mm. 90 R. P. S.

Trial	1	2	3	Aver.	Max. Var.
1–2..	4.11	3.98	3.92	4.00	.19
1–3..	4.25	4.09	4.06	4.13	.19
1–4..	4.45	4.22	4.16	4.28	.29
2–3..	.14	.11	.14	.13	.04
2–4..	.34	.24	.24	.27	.10
3–4..	.20	.13	.10	.14	.10

TABLE III

E. D. M. 1806 A. Gap No. 1, .44 mm.; No. 2, .22; No. 3, .22; No. 4, .44. 90 R.P.S.

Tria l	1	2	3	Aver.	Max. Var.
1–2..	4.14	4.68	4.80	4.54	.66
1–3..	4.40	3.99	4.64	4.34	.65
1–4..	4.26	4.55	4.84	4.55	.58
2–3..	.26	—.69	—.16	—.20	.95
2–4..	.12	—.13	.20	.03	.33
3–4..	—.14	—.56	.36	—.11	.92

Points numbers two and three were then screwed down until they just touched the drum and the whole arm then raised .22 millimeters. This made points one and four .44 millimeters from the drum, and points two and three .22 millimeters from the drum. As it happened, points two and three required just half a turn to bring them down .22 millimeters. Hence, not only the effect of sparking distance was observed but also whether the rotation affected the results.

One set of three readings was taken with the drum standing still and one set was taken with the drum running at 90 revolutions per second, with this spark setting (Tables III and IV).

TABLE IV

E. D. M. 1806 A. Gap No. 1, .44 mm.; No. 2, .22; No. 3, .22; No. 4, .44. R.P.S., 0.

Trial	1	2	3	Aver.	Max. Var.
1–2..	3.79	4.07	3.97	3.94	.28
1–3..	3.95	4.07	4.25	4.09	.30
1–4..	3.95	4.25	4.25	4.15	.30
2–3..	.16	.00	.28	.15	.12
2–4..	.16	.18	.28	.21	.12
3–4..	.00	.18	.00	.06	.18

TABLE V

E. D. M. 1806 A. Gap No. 1, 1.10 mm.; No. 2, .22; No. 3, .22; No. 4, 1.10. R.P.S., 0.

Trial	1	2	3	Aver.	Max. Var.
1–2..	3.94	3.91	3.80	3.88	.14
1–3..	3.98	4.15	3.83	3.99	.32
1–4..	4.18	4.15	4.03	4.12	.15
2–3..	.04	.24	.03	.10	.21
2–4..	.24	.24	.23	.24	.01
3–4..	.20	.00	.20	.13	.20

The arm was then raised .66 millimeters and points two and three screwed down one turn or .44 millimeters. This made points one and four 1.1 millimeters from the drum, and points two and three, .22. Two sets of readings were made as before (Tables V and VI).

TABLE VI

E. D. M. 1806 A. Gap No. 1, 1.10 mm.; No. 2, .22; No. 3, .22; No. 4, 1.10. 90 R.P.S.

Trial	1	2	3	Aver.	Max. Var.
1–2..	3.84	3.75	3.93	3.84	.18
1–3..	4.02	3.96	4.18	4.05	.22
1–4..	4.03	3.80	4.32	4.05	.52
2–3..	.18	.21	.25	.21	.07
2–4..	.19	.05	.39	.21	.34
3–4..	.01	—.16	.14	.00	.30

TABLE VII

(Four misses in 6 shots.) E. D. M. 1806 A. Gap, .30 mm. 90 R.P.S. Magnetic cores.

Trial	1	2	3	Aver.	Max. Var.
1–2..	3.41	3.64	3.50	3.52	.23
1–3..	3.46	3.49	miss	3.48	.03
1–4..	3.41	3.75	3.84	3.67	.43
2–3..	.05	—.15	—	—.05	.20
2–4..	.00	.11	.34	.15	.34
3–4..	.05	.26	—	.15	.21

The points were then all adjusted to .22 millimeters from the drum, and $\frac{3}{8}$-inch iron rods placed through the center of the induction coils as magnetic cores. The rod passing through coil number 3 was provided on each end with a thread and two nuts, between which a piece of $\frac{1}{8} \times \frac{3}{4}$-inch strap iron, in the form of a U, 21 inches between the legs and 5 inches deep, was clamped to form a complete magnetic circuit.

A set of three readings was then taken with a .30-millimeter spark gap and the drum running 90 revolutions per second (Table VII). The cores were then removed and a set of 10 readings taken with a .30-millimeter spark gap and the drum running 90 revolutions per second (Table VIII).

TABLE VIII

E. D. 1806 A. Gap, .30 mm. 90 R. P. S.

Trial	1	2	3	4	5	6	7	8	9	10	Aver.	Max. Var.
1–2..	4.20	4.17	4.16	4.28	4.45	4.25	4.29	4.32	4.17	4.12	4.24	.33
1–3..	4.33	4.30	4.34	4.37	4.45	4.87	4.44	4.45	4.20	4.20	4.38	.67
1–4..	4.20	4.34	4.24	4.40	4.40	4.60	4.14	4.27	4.00	4.03	4.26	.60
2–3..	.13	.13	.18	.09	.00	.62	.15	.13	.03	.08	.14	.62
2–4..	.00	.17	.08	.12	—.05	.35	—.15	.05	—.17	—.09	.02	.34
3–4..	—.13	.04	—.10	.03	—.05	—.27	—.30	.18	—.20	—.17	—.12	.34

In all the preceding tests use was made of a number 7 electric detonator to break the circuit. To do this four pieces of number 26 B. & S. double cotton-covered copper wire were half hitched about the portion of the detonator containing the charge. Use was made of a running half hitch (or clove hitch), so as not to kink the wire. One of the wires was placed in each of the induction coil circuits.

Another set of these readings was made with the .30-millimeter spark gap and the drum running 90 revolutions per second, but dynamite was used in the standard way to break the circuits (Table IX).

TABLE IX

E. D. 1806 A. Explosive D 1906 A. Gap, .30 mm. 90 R. P. S. Standard Method (Circuit broken with dynamite)

Trial	1	2	3	4	5	6	7	8	9	10	Aver.	Max. Var.
1–2..	4.22	4.28	4.08	4.12	5.20	4.24	4.44	4.51	5.35	4.90	4.53	1.27
1–3..	4.34	4.31	4.15	4.26	5.02	4.78	4.64	4.26	4.99	4.69	4.54	.87
1–4..	4.16	4.20	4.10	4.14	4.80	4.40	4.25	4.70	4.45	3.91	4.31	.89
2–3..	.12	.03	.07	.14	—.18	.54	.20	—.25	—.36	—.21	—.01	.56
2–4..	—.04	—.08	.02	.02	—.40	.16	—.19	.19	—.99	—.99	—.23	1.15
3–4..	—.18	—.11	—.05	—.12	—.22	—.38	—.39	.44	—.54	—.22	—.19	.98

CONCLUSIONS

As will be seen from the preceding tables, the distance of the spark point from the drum did not materially affect the readings. The only noticeable effect was that the percentage of misses increased as the spark gap increased.

The spark crater was not measurably affected in size or shape by the sparking distance. In the case of points one and three, it consisted of a group of spots in the form of a circular cluster approximately $\frac{3}{4}$ millimeter in diameter, while two and four were merely smudges with occasionally a bright spot in the center. This was so in all cases save where the iron core was used, when points one and three appeared as a line of spots.

In all cases when the drum was rotating the head spot was taken as the point to measure to, and when the drum was at rest the center of the cluster was used.

The iron cores did not seem to appreciably decrease the maximum variation, but did increase the percentage of misses. The sparks in this case are much more easily read.

The deficiency in the instrument seems to arise from two sources, the character of the spark crater and the method of breaking the circuit.

The first cannot well be remedied without impairing the accuracy or the simplicity of the instrument.

The coils could be so designed as to produce a single intense spark, but then this would be only produced at a critical sparking

distance. At greater distances no spark would mark the drum, and at best there would be a number of sparks as at present.

Should coils having a magnetic core be used, the period of sparking would be decreased so as to produce a line of sparks, the head of one of which could easily be read, but then the time lag of the coils would become an appreciable factor. All of the coils would have to be very accurately built, installed and calibrated, and even then would not be correct, as there is a slip connection in the sparking circuit between the coils and the drum, and this would have a varying resistance which would materially affect the accuracy, as the period, and hence the lag, is dependent to a considerable extent upon the resistance of the circuit.

The only other general type of coil is that producing an undamped spark such as is in use at present.

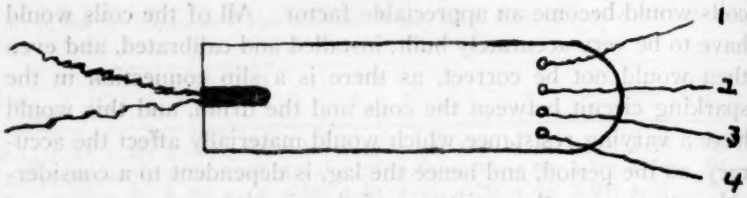
The question of spark coils does not appear to be as important as the method to be used in determining the zero of the instrument, or, more specifically, the method of breaking the wires. If the readings obtained by using a detonator are compared with those obtained using dynamite in the standard way, it will be seen that the maximum variation obtained using dynamite in the standard way is very large. I question whether using dynamite in the standard way is a fair one. It does not simulate the conditions obtained in a standard file in any way save that the wires pass through the explosive.

I cannot see why wires passed through the explosive should be broken with any uniformity. In the case of the file, the metal case tears the wires apart, and when they are properly kinked over the case uniform breaking may be expected. This is not the case with the single cartridge. In some cases the wires were found with the insulation stripped back for a considerable distance and the wires badly elongated, showing that an appreciable period had elapsed before the wires broke. Hence if the wires are of material having exactly the same physical constants, a variable enters.

It would seem that the detonator method is the fairest method, as here the wires are so arranged as to insure a fair degree of uniformity in breaking, and the rate of breaking is so high as to reduce its effect to a minimum. It would seem that this variation cannot be much reduced below .50 millimeter, under the present conditions, but the instrument should be read as close as possible so as not to increase this variation.

SUPPLEMENTARY REPORT

Previous to the tests by Russell B. Munroe, it was customary to calibrate the Mettegang recorder before each series of tests by breaking the wires when arranged thus:



¼ x 8-INCH CARTRIDGE WITH DETONATOR.

and with the drum running and points .22 millimeter from it.

Since Munroe raised the question of the accuracy of this method of breaking, the wire tests have been conducted by placing the 8-inch × 1¼-inch cartridge in a 1⅜-inch galvanized-iron tube and proceeding as before, but with the copper wires kinked on each side of the tube at the position where they passed through small holes in it.

Ten shots were fired in this manner with the spark points .22 millimeter from the rotating drum (Table X).

TABLE X

E. D. M. 1806 A. Explosive D., 2014 C. Gap, .22 mm. 90 R. P. S.

Trial	Distances Read Between Spark Points (millimeters)					
	No. 1-2	No. 1-3	No. 1-4	No. 2-3	No. 2-4	No. 3-4
1st	+4.22	+4.43	+4.43	+.21	+.21	.00
2d	+3.57	+3.70	+3.91	+.13	+.34	+.21
3d	+4.31	+3.95	+4.00	−.64	−.31	+.05
4th	+4.05	+4.16	+4.30	+.11	+.25	+.14
5th	+4.14	+3.88	+3.74	−.26	−.40	−.14
6th	+3.72	+4.14	+4.30	+.42	+.58	+.16
7th	+4.48	+5.40	+4.25	+.92	−.23	−1.15
8th	+3.97	+3.95	+4.75	−.02	+.78	+.80
9th	+3.95	+4.25	+4.18	+.30	+.23	−.07
10th	+4.74	+5.88	+5.11	+1.14	+.37	−.77
Average	+4.12	+4.37	+4.30	+.23	+.16	+.01
Max. Var.	1.17	2.10	1.37	1.78	1.18	1.95

TABLE XI

Actual Corrections for Spark Points. Obtained by Lowering Arm so that Points Marked on the Soot

No. 1–2	No. 1–3	No. 1–4	No. 2–3	No. 2–4	No. 3–4
+4.16	+4.30	+4.35	+.14	+.19	+.05

TABLE XII

Variation of Average Recorded Distances from Actual Correction

No. 1–2	No. 1–3	No. 1–4	No. 2–3	No. 2–4	No. 3–4
−.04	+.07	−.05	+.09	−.03	−.04

TABLE XIII

Maximum Variation of Recorded Distances from the Actual Distances

No. 1–2	No. 1–3	No. 1–4	No. 2–3	No. 2–4	No. 3–4
−.59	+1.58	+.76	+1.00	±.59	−1.20

The actual distances between the platinum spark points in the direction of the rotation of the drum were laid off on the soot-covered drum by lowering the arm supporting the screws until the points scratched the soot as the arm was moved in a horizontal line (Table XI).

The following figures were calculated to show the variation between the actual correction for spark points (Table XI), and the recorded distances (Table X).

1	was	more	than	1.50	mm.	in error.
4	were	"	"	1.00	"	" "
9	"	"	"	.75	"	" "
15	"	"	"	.50	"	" "
28	"	"	"	.25	"	" "
44	"	"	"	.10	"	" "
50	"	"	"	.05	"	" "
56	"	"	"	.02	"	" "
4	"	less	"	.03	"	" "

In no case was the average of the six corresponding distances more than .09 millimeter in error (Table XI).

CONCLUSIONS

From the results of these tests, as well as from those conducted by Munroe and from previous experience with the Mettegang recorder, the following conclusions are evident:

1. The recorded distance between any two spark points may be more than 1.50 millimeters in error in either direction (Table XIII).

2. The same result, with narrow limits of error (Table XII), may be obtained by lowering the spark points to mark the soot coat, as can be obtained by running a series of 10 shots with the drum rotating and breaking the wires with high explosive.

3. The degree of accuracy of reading the distances between the spark points is out of all proportion to the accuracy with which they are established (Table XIII).

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE WAR CRUISES OF H. M. S. *KARLSRUHE*

EXTRACTS FROM MY WAR-DIARY

(CONCLUDED)

By LIEUTENANT AUST

Free translation by LIEUTENANT J. H. KLEIN, JR., U. S. Navy

PROFITABLE WORK

4 September.—The following night was very light and clear. For the first time since our separation on 6 August we heard from the *Kronprinz Wilhelm*. We heard her radio without, however, endeavoring to communicate with her, as we did not wish to give away our position. As we well knew, there were 11 English warships all around us, among them some of our old acquaintances of the West Indies. We therefore decided to be as still as a mouse, even though we preferred to have an hour of gossip with Lieutenant Thierfelder.

5 September.—On the night following we again heard much radio work. Among the many secret code messages between the English cruisers we heard the report that the steamer *Kap Trafalgar* had been transformed into an auxiliary cruiser for work on the South American coast, and that our gunboat *Eber* had entered Bahia under the commercial flag. Then the land station, Olinda, at Pernambuco, reported in Italian to an Italian passenger steamer these short but comprehensive sentences: "Germans before Paris; Russians in Lemberg; Turkey has declared war on the Allies."

The Germans before Paris! Then next morning at reveille there was a big hullaballoo in the ship. Soon we had forgotten all fears that had sprung up at the beginning of the war when the declarations of war followed like one blow after another. The small grains of truth contained in these few words dispelled all the lies which had reached us heretofore.

When we met the *Asuncion* that afternoon she told us that the *Kronprinz Wilhelm* had spent the entire day of 3 September taking provisions from her. We must have passed each other at no great distance. Thierfelder had left a letter for the captain in which he reported his operations up to that time. Although we were very sorry not to have seen him, we were pleased to know that he was as well off as we were and that he lacked nothing.

6-8 September.—After the *Asuncion* had transferred the *Strathroy's* crew to the *Krefeld,* the *Karlsruhe* hurried to the calm place where the *Strathroy* waited for us with her cargo of coal. The coaling lasted until 8 September.

The glowing heat made the coaling a very hard task. The entire crew worked during daylight. During the night the crew was divided into two watches, which relieved each other every four hours.

These days were the most dangerous, perhaps the only dangerous, ones we had. In the open sea it was not so easy to surprise us. Steam was kept up to the highest pressure so that the engines were always ready for full power. Of course the guns and torpedo-tubes were always kept ready for action.

But all this changed as soon as we took the steamer alongside in order to get coal out of her. Readiness for action was seriously interfered with. Should an enemy appear the ships would first have to get clear of each other. Then we would have to get rid of the coal that was piled all over the deck and thus prevented the service at the guns. In any event much time would be lost before the ship could have been properly cleared for action.

This loss of time might be the deciding factor against us if an enemy ship should approach our coaling place by night or in inclement weather, such as we often suffered, especially in the early morning.

At night all unnecessary lights were doused. On the sea side the ships were entirely darkened. Low-powered lights burned only in the cargo holds of the steamer and at the most important places on the *Karlsruhe.* On such days the lookouts were doubled and only responsible men detailed for this duty.

9 September.—After filling up with coal we again set out to waylay ships. We took *Krefeld* and *Rio Negro* along; one formed our eastern scouting face, the other the western.

10-13 September.—In order to use as little coal as possible, that is, in order to reduce the dangerous coaling days to a minimum, the captain stopped the ship.

As long as no steamer appeared to give us work and diversion the time passed slowly and monotonously. Several hours were devoted daily to drills, usually "general quarters." In the leisure hours shark fishing was the best sport. The sharks on the high seas are smaller than the giant fishes that inhabit the waters along the Mexican gulf coast. They are hardly two meters long. It is surprising how quickly these beasts will appear if there is anything to be had. A short time after the ship stopped they swarmed around under our stern. As soon as they showed themselves the shark hooks were put over and some of them were soon caught.

The shark-shooters, however, had more success than the fishers. Several officers on the bridge or on the quarter deck shot the sharks whenever, in their eagerness, they showed their heads above water trying to grab the hunks of meat that were suspended close to the surface. Several of the robbers were sent back to the deep with battered heads or shattered spines.

Every time that the ship stopped for a time to transfer provisions, etc., from a captured steamer, a school of sharks soon gathered near our stern. Soon the rifles were busy cracking away at them.

14 September.—We were beginning to grow impatient because no smoke clouds came in sight. During the night of 14 September the engines suddenly went ahead from "Stop" to a high speed. We hurried to the bridge and saw the lights of a steamer ahead of us. The captain waited until the gray of morning and then set out for her. Her patriotic colors on her smoke-pipe were very pleasing to us: "Black, white, red"; much more pleasing than the English flag which she soon hoisted. As she paid no attention to our polite flag signal but kept going ahead undisturbed, we had to make our meaning plain by firing a blank shot. That worked at once.

The steamer was the *Highland Hope* of the Nelson Line. She was heading for Argentina to take a cargo of cold-storage meat to England. For this purpose she had been fitted out with a brand new cold-storage plant. In order not to delay her return to England she had been amply provisioned and coaled beforehand so that she would not have to stop to do this before starting back.

In addition to all these useful presents the Englishman brought us a complete file of English newspapers. These included even the illustrated papers. We saw, for the first time, pictures of the war. You can imagine how eagerly we all pounced on them as soon as the prize officer sent them aboard. In a very short time they disappeared in the mess rooms, officers' rooms and the men's quarters. As the newspapers contained some news items which would be of service in our operations (as, for instance, the steamer schedules, the arrival of strange warships in the various harbors, etc.), the captain ordered the prize officer to be sure that hereafter all the newspapers were sent to the bridge. It was very funny to see how one after another stole into the chart house to get a peep at the papers. The captain himself would get so interested in the news that it was hard to drag him away from them to dictate the answers that were to be signalled to the prize officer who sat over there impatiently swearing that he would not "find" any newspapers on the next steamer. But he did it just the same and the same proceeding would be repeated, everybody on the bridge quickly interesting himself in the newspapers.

The articles were neither easy nor good to read. Only after much labor could we wade through all the thick lies and finally reach a few words of truth and, in spite of all the twisted and hidden meanings, arrive at a picture of the approximate condition of affairs in Europe. We knew what value to place on the lies. After our experiences in San Juan and Wilemstad we did not expect much else. It was more difficult to understand the hate which was attached to everything German. Even the better papers, like the *Illustrated London News,* made no secret of this. None of us expected this attitude from a nation that prided itself throughout the world on its position and associations. In the middle of this slander were the Kaiser and the Crown Prince. Of the generals, General von Kluck seemed to have drawn most of the British hate. Hair-raising stories were told of him. From this we gathered that he had been the most successful general in the west, and, as we later discovered, we were correct. After Kluck came all the other generals, the other officers and then the entire army with their atrocities. And these papers were distributed throughout the world on thousands of steamers!

In our anger we cast the yellow sheets aside, only to get them back again shortly after, because they were the sources of our only reports.

The captain undertook to clip and paste the worst lies and slanders. In this way he gathered a thick folio. He called it "The Gathering of Lies."

Up to this time we had had the luck to meet nothing but English steamers, even though this main artery of commerce was used by many neutral steamers. While we were going through the regular work of transferring the crew to the *Krefeld,* taking over the radio apparatus, provisions, etc., a larger steamer was sighted which, from her radio conversation, we knew to be the Spanish steamer *Reina Victoria Elena* of the Compania Maritima of Barcelona. The reports from the radio rooms were substantiated by the outward appearance of the vessel and the Spanish mail flag which she flew, so that the captain decided not to search her. When she came in sight she asked, by radio, for our name and would not keep quiet. As her ceaseless questioning finally grew tiresome, the captain sent her the answer, "Convoying British ships." Even though we gave this answer as weakly as possible, an English ship, in our immediate neighborhood, could not help but pick it up. Of course, she immediately questioned the Spaniard concerning the remarkable "convoy" of which she knew nothing. But the Spaniard would not answer her. Instead the Spaniard asked her name, which she gave in such an indistinct manner that we could not make it out. The Spaniard then gave the Englishman her position.

This incident was rather unfortunate for us. Until that time we had been lucky enough to conceal the scene of our operations. And now, because of this accident, everything might be ruined.

The captain decided to leave the commercial route to Europe for a while and to go instead to the route to North America in order to try his luck. *Highland Hope* was blown up. Then the *Karlsruhe* with her two attendant steamers headed westward.

15 September.—We arrived in the track of the sailing ships. Since the beginning of the war we had not as yet run across a sailing vessel. On this day we met two. The first was a three-masted, full-rigged ship flying the Norwegian flag. A large sailing vessel under full sail is a beautiful sight, especially in the trade-wind region where the sun shines from a cloudless sky down on the azure blue ocean. The ship hove to at our order. She was the *Sorfareren* of Christiansand. She came from New Caledonia and was carrying a cargo of chromium for a Nurenberg firm to

Gothenburg. Therefore the captain was treated very politely. We were so fortunately situated that we could present him with half of a freshly slaughtered sheep and some new potatoes, which caused the captain no end of wonderment. He received this most gratefully and acknowledged our flag signal, "Pleasant voyage," with the same wish.

The second sail hove in sight that afternoon. She was a three-masted bark, apparently also a Norwegian. The captain decided not to stop her.

During the last eight days we had captured only one steamer. We now had to plan on filling up our bunkers. The coal supply was never permitted to fall below a certain amount, because we had to be ready for almost anything, such as meeting enemy warships and being pursued for a long time.

17 September.—We were rather downcast over our bad luck in having to leave the main commercial lane when our lookout reported: "Smoke, four points on port bow," and the ship immediately livened up. Eight bells had just been struck. The steamer—it was a steamer—fell, so as to speak, in the middle of our soup at dinner.

Of course the mastheads appeared over the horizon first. Very quickly thereafter came the smoke-pipe. And then, for a long time nothing more showed up, the smoke-pipe growing longer and longer. Mirages are rare in these waters. Therefore the steamer must have an especially long funnel. And this was the case as we soon discovered. Even when at a great distance away she hoisted the English flag.

Indrani was the name of our new acquaintance. Her home port was Liverpool. She seemed to be new and in excellent condition. The officers in their clean white tropical uniforms stood around on the bridge, where we also noted some especially fine and comfortable Madeira chairs. The Chinese crew were dressed in freshly washed, light-blue garments. We hoped that this ship would be laden with general merchandise. All eyes were glued on the signal flags of the prize-quartermaster. Then he signalled: "6700 tons Pocahontas coal from Norfolk to Rio de Janeiro." It seemed as if the English actually knew that we were on our way to replenish our coal supply! Our joy was all the greater because this was so unexpected.

The *Indrani* had all the conveniences of the *Strathroy,* and, in addition, was fitted with a radio. She would, therefore, make an excellent collier for us. It did not take long to make the change in her. Except one machinist who did not mind serving us, which service we gratefully accepted, the rest of the English wandered over to the *Krefeld;* the first officer of the *Rio Negro,* Jalaes, took command of the *Indrani;* Ensign of Reserves Hentschel, two petty officers and four seamen went aboard as the military crew, and the work was finished.

The English captain of the *Indrani* was favorably disposed. When the prize officer received orders from our captain to pass the word to our captured crews he always preferred to go to this captain. He seemed to take precedence over the other captains. Of course, the captured crews were not allowed to have any weapons. But the *Indrani* captain had a shotgun to which he was attached. He therefore requested permission to keep it. It was kept for him on the *Karlsruhe* and returned to him when he left. He was very thankful to our captain for this favor.

The *Indrani* had North American newspapers. They were better than the English, in that instead of the low-down hatred they catered to harmless sensationalism. Of course, they did not lie any less because of this. Much fun was caused by an article in which were described the extensive orders issued by the English Admiralty in regard to finishing the *Karlsruhe.* The ships sent out from England were not to return until our beautiful ship had been sunk. We were not a little pleased to note that we had become obnoxious to the British! In the beginning we often read in the newspapers about our wonderful adventures. In San Juan de Porto Rico we were described as "captured," later on (in any English newspaper) we were "sunk," then again we were only "disabled," and now we again seemed to be hale and hearty, so much so that all the ships that surrounded us—and we knew from their radio calls that there were not less than 22!—were unable to "disable" us. For this purpose four more armored cruisers were sent out. How did we escape them!

The *Indrani* was left behind with the *Rio Negro* and the *Krefeld.* We set out with the *Asuncion* to coal, in much better humor than we were in during the forenoon.

18-19 September.—Protected by a heavy fog we began this coaling. It lasted one day and one night. The next day was a day of

rest for the exhausted crew. Then we headed for our old place north of the Island Fernando Noronha and lay in wait.

20 September.—On the way there we paid a short visit to the *Indrani* and *Krefeld* in order to find out how our English wards were getting along. They had been behaving perfectly. We took the *Krefeld* and *Rio Negro* with us, leaving the *Indrani* behind.

21 September.—We did not have to wait long. On the first morning after our arrival the cheerful report of the lookout told of the approach of a steamer.

We hardly had to move out of our tracks. The steamer headed exactly for us. When she had arrived near enough so that we could make out her flag we suffered a slight disappointment; she flew the colors of Holland. She was the *Maria,* old and rather neglected looking, and was loaded down.

The signal from our prize officer changed our disappointment to joy. The *Maria* was under the charter of a London firm, carrying wheat from Portland (Oregon) to Belfast and Dublin. Ship and cargo were therefore confiscated and liable to destruction.

We figured out that this cargo was sufficient to provide bread for the entire population of London for 14 days, and so we thought: "Whoever digs a grave for somebody else is likely to fall in it himself!"

While the crew of the prize was being transferred and the explosives were being made ready, a second steamer on a southerly course hove in sight to the westward. The *Krefeld* remained with the *Maria* in order to pick up our men after the explosion and to wait for the steamer to sink. The soft-hearted English captains had begged our captain not to send them away again when a steamer was about to be sunk. They also wanted to see this scene! The captain granted their wish.

The *Karlsruhe* then hurried away to attend to the latest arrival. The pipes of the boatswain's mates on watch blew all over the ship: "The reserve prize crew be ready to leave the ship!" Good enough! We certainly had our hands full!

Even at a great distance we could, by means of the telescope, make out in the clear atmosphere the red English commercial flag.

The steamer was the *Cornish City.* Her home port was Bideford. She was bound to Rio de Janeiro with 6400 tons of Cardiff coal for the English Brazilian Coal Co. We were especially pleased with this, because several hours previously the captain of the *Maria*

had told us that the English cruiser *Glasgow,* loaded down with coal, had left *Rio de Janeiro* in order to chase the *Kronprinz Wilhelm,* and that the coal company was now short of coal. The coal we had captured was evidently consigned to the English company that had supplied their cruiser.

The *Cornish City* was an old steamer that had seen much service. We did not have the necessary men to convert her into another collier. As we were well supplied with coal for the present the captain decided to sink this prize.

About half the crew were English, the other half Chinese. They were transferred to the *Rio Negro* that had followed us.

Then the steamer was bombed. She filled rapidly and sank. The *Krefeld* arrived just in time to witness the sinking.

A very successful day lay behind us. But before the *Cornish City* sank we heard strong radio messages being sent by the English steamer *Amazon.* This was a large passenger steamer of the English Royal Mail S. P. Co. If we captured her this would crown the day. The excitement was intense while the increased lookouts searched the horizon.

Meantime it grew dark. About 10.00 p. m. the lights of a steamer were seen to the eastward. Of course we all had hopes that this was the *Amazon,* and so we gayly pounced on her. As the captain expected to find many neutral passengers on her he decided not to hold her up until daylight.

The night was thick. Heavy rain and squalls passed over us all night. Several times we lost sight of the light.

22 September.—The breaking day brought us a sad disappointment. Ahead of us rolled a small ship heading north. On closer approach she, in order to increase our anger, hoisted the Italian flag.

The steamer was the *Ascaro* of Genoa. She was carrying corn from Rosario to St. Vincent (Cape Verde). Like most steamers of that nation she looked dirty and very neglected. When the prize officer returned from his work he seemed weak in the stomach from the terrible odors that pervaded the steamer.

Her papers were absolutely clear, so we had to respectfully permit her to continue on her way.

But we soon received our reward for the tomfoolery that the Italian had perpetrated on us. While the prize crew was going over to the Italian, a second steamer hove in sight to the north-

westward. She hoisted her flag at once, which we immediately recognized as a beautiful, large and new Union Jack. The Britisher had mistaken us for a friendly cruiser and could not imagine why we were hurrying to meet her. She then hoisted an enormous flag at the masthead so that we could see her better. But soon she seemed to smell a mouse; the red cloth was quickly hauled down and was never sighted again.

The case of this steamer was similar to that of most of the others. They never suspected anything as we steamed toward them, always thinking we were a British cruiser. What else could they meet on the free ocean except warships of the sea-ruling Britannia? They never thought of meeting a German man-o'-war until they saw us hoist our war flag. Later on, however, when the press reports showed that many steamers were disappearing, the English captains seemed to get an inkling of the true state of affairs. After that we occasionally held up a steamer and found that the men had already packed up their clothes and had cleared away the boats ready for lowering.

About 6.40 a. m. we captured the steamer *Rio Ignassa* from London. She was carrying 4800 tons of coal from Newcastle to Rio de Janeiro. The crew consisted entirely of Englishmen.

She was sentenced to be sunk for the same reason that the *Cornish City* was sunk.

While we were doing this a steamer came in sight heading straight for the *Karlsruhe*. When ordered by flag signal she came close aboard and stopped. She carried the Swedish flag, was named *Princess Ingeborg* (Axel Johnson and Co., of Stockholm), was loaded with merchandise and passengers, among them several German ladies and children, and was heading for South America. Her papers were quickly examined and she was then released.

The captain first decided to fill up our bunkers before sinking the prize. But this was given up because of the heavy sea. The English captain assured us that he did not have very good coal and that we would surely soon meet other steamers that would bring us better fuel. This agreed with our own expectations.

The *Rio Ignassa* was bombed in two places, namely, in the shaft-alley and forward in the "collision room." She sank rapidly, heeling over at the finish. This was the first steamer we saw sink in the daytime. Shortly before she heeled over one of her flags broke out and it was the letter "Q" which means: "I wish to

signal you." Of course nobody had remained on board. It was another trick of the bogey man.

This steamer also brought many newspapers. In one of the illustrated papers was a good picture of the sinking of the *Mainz*. The ship, about half sunk, continued to fire her guns at her more powerful and more numerous foes. The picture was pasted up in the men's quarters and the necessary remarks added to it.

The press reports that concerned us were now being translated and made up into a sort of ship-newspaper which was distributed among the men.

PAUSE!

23-27 September.—Since leaving the home country the *Karlsruhe* had, barring a few short stops, been underway constantly. The boilers and engines can be called the heart of the ship. In order to keep her well and strong these must be overhauled from time to time.

As all the English warships were, to all appearances, a good distance away, we decided to use several days for this purpose. A surprise by an enemy cruiser would have been fatal to us at such a time because the engines were not ready. In order to prevent a surprise we proceeded a good distance to the westward out of the commercial highway.

The other ships also needed repairs and so they used these days for the same purpose. The ship was pretty badly damaged by the constant coaling. The paint on the side had been worn away and the rust showed through in many places. Very little of the deck linoleum remained. The bare steel came through all over. The first officer did his best to remedy these conditions.

Other than this, these days were much like the days when we lay in wait without sighting anything.

The shark hooks were broken out. The officers amused themselves shooting sharks. During spare hours we hunted places free of coal dust in order to sleep or read.

The best gathering place was still the navigating bridge which was always clean.

As long as the quarter-deck and the remainder of the main-deck was covered with a deck-load of coal there remained only the poop to go to in order to get some fresh air, but even this was no good when the wind blew the coal dust around. As soon as the coal on the quarter-deck was passed down to the bunkers the after

end of the main-deck was thoroughly scrubbed down. Then we had a place "to promenade" and "to Müller" [evidently the Müller physical exercises], of which we were all in need. The captain also enthusiastically joined us in these physical exercises.

After the evening meal the men would gather on the foc's'le, the officers on the bridge, and listen to the music. Our ship's band was gathered after much work before the ship left home. Their performances were better than those of other ships' bands, barring the regularly organized government bands.

Every Sunday the captain held a short service on the quarter-deck. The band then played on the after-deck. Refreshments and cigarettes were also served to the men.

The steamers accompanying us were always invited to these concerts. On the *Krefeld* several hundred Englishmen, Frenchmen, Chinese, negroes, etc., would crowd the rail on the side toward us, all listening to the strains of "Deutschland, Deutschland, über Alles" and the "Watch on the Rhine," which were always sung as a finale. The repertoire of our band was very extensive. The latest opera hits were played as readily as the oldest Prussian ballads.

One day our men got up a real minstrel show on the foc's'le. There were plenty of comedians among them. Their efforts were rewarded by heavy salvos of laughter. One of the mates discovered that he possessed poetical talent, and one day he showed this to an astonished but thankful audience.

And day after day the wonderful sun continued to shine down upon the endless, deep-blue surface as if there were nothing more peaceful than this poor earth. It is a pleasant feeling to wake up in the morning and know that the sun is shining!

The captain would invite several of us to dine with him nearly every evening at dinner, and on Sunday to lunch. Of course, the conversation soon got around to the political situation at home, and from that it was not much of a jump to our relatives. Nobody knew anything definite about his own. The last letters were written at the end of June. This one had a father, that one a brother or brother-in-law in the field. But no one knew on which front they were serving. The captain always drank a toast to the welfare of our loved ones at home.

OUR BEST WEEK

28 September.—After completing her repairs, the *Karlsruhe* proceeded to her coaling place. On the way we met the *Asuncion.* She had emptied the *Strathroy's* bunkers and then sunk her. The *Strathroy* crew transferred to the *Krefeld.*

29-30 September.—While coaling we received the joyful news that the Fortress of Maubeuge had surrendered with 40,000 men, four generals and 400 guns. We even received news of the *Emden* and were very pleased about her successful cruise.

1 October.—Loaded to the limit with coal, we started back to our region of operations on 1 October. The entire main-deck and quarter-deck were piled about 1 meter high with coal. The ship did not ride the high seas very well, vibrating as each large wave passed under her.

2 October.—The following day the *Asuncion* brought as a lot of important telegrams.

Our auxiliary cruiser *Kap Trafalgar* had been sunk. That was a sad message.

Our cruiser squadron was on its way to South America. The English cruisers *Good Hope, Monmouth* and *Glasgow* had started to the southward. We were anxious to learn the result of the events that would soon take place off the west coast of Chili. In addition to those named above, three other English warships had rounded Cape Horn.

A great coal famine existed in Brazil. In the large cities only a limited amount of electric lighting was permitted. The trains had reduced their schedules. (We thoroughly understood the reason for this!) The government had forbidden the export of coal. If, even in spite of this, the English ships left Brazilian harbors "loaded down with coal," then we knew how poorly the neutrality laws were being observed, which must not be ascribed entirely to the bad feelings of the Brazilians but mainly to the pressure which England exerted upon them.

3-5 October.—For two days we lay in wait without results. About noon of the third day the *Krefeld,* that had been sent by the captain several miles to the eastward, sent us the signal: "I have a steamer in sight."

The vessel was steaming to the eastward of the usual trade lane. Therefore she could not have a very clear conscience!

This time the chase lasted two hours. Therefore our joy was all the greater when we received the report: The English steamer *Farn* has 7000 tons of the best Cardiff coal bound for Montevideo from Barry. As the Chinese and German crew of the *Strathroy* had been relieved of their duties, this cargo saved their lives. She would take the place of the *Strathroy*. Lieutenant of Reserves Lubinus would be her new captain.

The captain had planned to send this coal to our cruiser squadron later on when their scene of operations was nearer and definitely known.

According to the story of the captain of the *Krefeld*, the English crews took a great part in the chase of the *Farn*. As soon as they saw the smoke clouds of the steamer they reported the fact to the captain and officers. During the chase they made bets as to the nationality of the steamer. Most of them wanted to bet on the English. When the flag was recognized they yelled in delight. The chase caused as much excitement, and apparently as much pleasure, for the Englishmen as it did for us.

The captain of the *Farn*, no doubt, pulled a long face when he climbed the *Krefeld's* gangway and was met by the sound of his countrymen's voices.

The captains of the steamers living on the *Krefeld* must have had mixed feelings as they watched the undisturbed operations of the German cruiser. They, of course, knew nothing of our worries, the constant lookout for enemy radio messages and the frequent signs of the approach of enemy warships. I wonder what the captain of the *Strathroy* thought, he who had witnessed the *Karlsruhe's* operations since 1 September.

At the beginning, when approached on the subject, the Englishmen aired their views in words somewhat as follows: "Just you wait! Before long our cruisers will be at your heels and then your little hour will come." Finally, however, they lost these hopes. And when anybody reminded them of their "navy" they would bite their lips and commence to swear.

On this very day an English warship patrolling between Cape Verde and South America came in our immediate vicinity. During the night his radio became so "howling" loud that the captain decided to steam several miles to the eastward. We stopped about 30 miles to the eastward of the usual trade lane.

6 October.—This time the *Rio Negro* was lucky. About 4.00 p. m. we received a report from her concerning the English steamer *Niceto de Larrinaga.* The prize crew went over. We, who remained aboard the *Karlsruhe,* pictured the usual procedure. Soon after the arrival of the prize officer the steamer crew would be gathered together. After the reports of the prize officer in regard to cargo, nationality, destination, etc., had been signalled over by the prize quartermaster the captain would signal back his decision: The steamer should be sunk. We pictured the prize officer informing their captain—a biting of the lips and then the usual nod ("All right, sir")—then a word to the gathered crew; all hurriedly disappear below decks. We knew that they were now packing their clothes and trinkets and would soon appear once more. The boats would be stowed and made ready for lowering.

Soon the captain himself would appear, chronometer and other nautical instruments under his arm. He had saved what was really valuable.

The *Niecto de Larrinaga* had a cargo of 8000 tons of oats and corn from Buenos Aires for London. Her crew and provisions went aboard the *Krefeld.* She herself took the road of all her predecessors except those we were using as colliers.

The steamer had a radio outfit. Like all the other steamers, she made not the slightest attempt to call English warships to her assistance, and even though the chase would only last one hour, she must have known that several ships were in the vicinity, and these would have known we were a German cruiser from the message.

We noted in her radio logs that she had been warned of us by the *Bristol.* The cruiser had advised her to steam about 30 miles to the eastward of the usual steamer tracks. It was her bad luck to follow this advice and run right into our arms, because we had gone that far to the eastward to escape the English cruiser.

The English captain was very astonished to be captured in spite of his caution. But he was still more astonished when our prize officer told him that we knew his course and had tracked him out there. Then, he said, we had probably caught the steamer that left Buenos Aires with him and was travelling the same course. The prize officer increased the captain's sorrow by saying that we were unfortunately delayed in capturing another steamer, whereupon the old man harmlessly remarked that we had better wait until morning; there were three of them leaving Buenos Aires at

the same time, and the third one, which was slower than his ship, would surely pass along here.

7 October.—We did not have to wait long for the expected steamer. About 7.00 a. m. she came in sight. We steamed ahead slowly to meet her. She anticipated her fate and hoisted the English flag when still a great distance away. At 8.00 o'clock we stopped the steamer *Lynrowan*. The calculation came out correctly. The captain did not seem to be surprised when the prize officer, this time more truthfully, assured him that we had been waiting for him since yesterday. Soon thereafter he was greeting his colleague on the *Krefeld*. They probably were very angry because the third one, or rather the first one, had had more luck and escaped us!

The captain had his sick wife and a young nurse on board. They were the first feminine guests on the *Krefeld* and were received with a great outburst of enthusiasm.

The *Lynrowan* had a cargo of 5000 tons of corn, sugar and tallow in hogsheads, and 12 automobiles received at Buenos Aires and bound for Liverpool.

The gunnery officer, Lieutenant (J. G.) von dem Borne, had begged the captain to give him this prize as a target for gunnery practice. After the *Krefeld,* with her Englishmen, had disappeared over the horizon, we made a run at extreme range, using target-practice ammunition, and then made several runs at close range using reduced charges.

The steamer *Lynrowan* sank about 3.00 p. m. The cargo hatches burst open when the ship was down deep under the water, and all the buoyant contents of the cargo holds, above all, several hundred hogsheads of tallow, shot to the surface. The captain tried to destroy this extensive field of wreckage by making several runs back and forth across it. But the hogsheads persisted in coming back in one bunch. The sharks gathered at once and fought over the lumps of tallow floating out of the splintered casks. The sharks experienced a rare thing, for these regions, in their hunt for game; numerous fat rats were running around on the casks trying to save themselves from the wreck.

It is not entirely safe to steam over a spot where a ship has recently been sunk. All sorts of wooden articles, such as yards, poles and cargo booms, break loose down in the depths and shoot up to the surface with great force. The force that tears them away down below is sufficient to break the heavy shrouds, etc., that

hold them in place. Even boats often break loose from their lashings and appear on the surface. In order to prevent their playing the rôle of traitors and later on giving away the sinking of the ship, it is advisable to punch holes in them before blowing up the ship. I consider it possible for the heavy timbers shooting up to the surface to actually pierce the ship's bottom.

The Englishmen on the *Krefeld* heard our firing and decided that we were in action. In their agitation they began to cause trouble. The next day the captain had this case investigated. It appeared, however, to have been entirely harmless.

From the Argentine newspapers which we found on board the last two steamers we discovered that Admiral Cradock had taken the *Good Hope* with him to the southward and had therefore shifted his flag. The *Good Hope, Monmouth* and *Glasgow* had remained in Montevideo for several days and celebrated just as they would have done during peace. Cradock and his flag lieutenant, Cumming, were pictured as heroes in all the newspapers. But there is no use in grumbling over the unfriendly actions of the neutral Uruguayans.

8 October.—The first rays of the rising sun had barely begun to paint the eastern heavens red when another steamer was sighted. She set her flag at once but soon hauled it down again when she recognized us. But we did not have to see her flag to recognize the colors of her smoke-pipe—blue funnel with black top and a broad white band—as belonging to one of the English steamers of the firm of Lamport and Holt of Liverpool. We were close aboard her by 7.00 o'clock. On her stern was the proud name *Cervantes.*

The signal of the prize officer told us the following: "4500 tons of cargo, fodder, sugar, hides and wool. The steamer came from South America and is heading for Liverpool. The crew consists of 43 men, practically all of whom are English, including four passengers from Punta Arenas and Rio Grande do Sul." These four were something new and were thankfully received as a welcome diversion.

After these 47 were received by their compatriots and fellow-sufferers in captivity on the *Krefeld*—the transshipment was accomplished very quickly this time because they had all previously packed their clothes—the prize officer went ahead with the blowing-up. He had devised a new scheme (the memory of

Bowes Castle still rankled!): the bombs were secured outboard below the water-line. We all anxiously awaited the result, and this time we were not disappointed. The explosion tore a great hole in her. The steamer sank very rapidly. About noon she painfully rose up out of the water for the last time and then shot stern first down into the depths.

There were now about 300 involuntary guests aboard the steamer *Krefeld*. The captain decided it was time to send these unnecessary eaters away. He therefore called Captain Vieth aboard for a conference. A neutral harbor, not too near, had to be chosen for their landing. The captain decided on Teneriffe as being the best suited for the purpose.

In order to get an idea of the "chaos of races" on the *Krefeld*, attention is invited to the following summary. On the 11 steamers captured since 1 September (excluding *Bowes Castle*) there were:

205 Englishmen (of whom two were women)
8 Finns
7 Russians
1 Belgian
2 Frenchmen

Total of 223 citizens of enemy countries.

107 Chinese
22 Spaniards
10 Hollanders
13 Swedes
4 Americans
2 Italians
3 Chilians
4 Norwegians
1 Dane
3 Swiss
2 Mexicans
1 Ecuadorean
1 Cuban
1 Greek
1 Arab (Mohammedan)

Total of 175 citizens of neutral countries.

All told there were, therefore, 20 different nationalities!

But before the steamer was released another addition arrived. About 11 p. m. the lights of a steamer hove in sight and we brought her to with a blank shot about midnight. In answer to our question she signalled back: "*Pruth* of London."

She had 2300 tons of barley and 3800 tons of saltpeter from Chili and was proceeding to St. Vincent under charter.

We intended to sink the steamer the next day. After sending a watch crew aboard her she remained stopped close to us.

9 October.—Early in the morning the crew of the *Pruth* was transferred and then the vessel was sunk. She sank about 10 o'clock.

Shortly after noon we stopped the Spanish mail steamer *Cadiz*. Her decks swarmed with passengers, and, of course, they all ran to the side towards us in order to stare at us, thereby giving the large steamer a heavy list.

Those passengers capable of judging such things must have wondered concerning the appearance of our ship. The results of the constant coaling could not be erased entirely. There was only one thing as immaculately white as it was during peace times and that was our flag.

They could not help being astonished over the appearance of our cutter's crew. They thought we were approaching starvation. But that was not the way our men looked; the excellent, sufficient and ever-fresh supplies of our prizes agreed with them remarkably well. The sun had burned them a reddish brown. They looked like Indians. We could have used them as medical advertisements. The cutter's crew were not exceptions to the general rule. The all-around physical condition of the men was very good. Had it not been it would have been impossible for them to have stood the strenuous work of coaling and hoisting cargo out of steamers in this glowing heat. Naturally the firemen suffered most from the effects of the heat. Therefore they did not appear to be so robust and full of strength and health as did the seamen. But even among them there were none seriously ill.

The steamer *Cadiz* was released very soon and then showed her gratitude by a vigorous blowing of the steam-whistle which we answered with pleasure. In addition we sent her a flag signal: "Pleasant trip."

10 October.—During the early morning hours we again stopped and released a neutral steamer. This time it was a Norwegian named *Bergenhus*.

The time had come again when we had to plan on filling up our coal bunkers. We headed for the rendezvous of the *Asuncion* and *Farn*.

Our most successful week lay behind us. Our last coaling on 1 October had certainly paid for itself. Since 5 October we had captured a steamer each day.

TAKING LEAVE

11 October.—About three o'clock the following afternoon, as the *Karlsruhe* approached the place where the *Asuncion* waited, the lookout reported three steamers ahead. He was scolded for not being able to count up to three. He refused to change his opinion, and soon we, on the bridge, could make out six mastheads that were soon followed over the horizon by three vessels. One was running away at high speed. The others remained quietly lying where they were. At the same time our radio operator reported that the *Asuncion* was yelling for help as she was being chased by an enemy ship. The running steamer therefore could not be other than the *Asuncion.* We quieted her and soon thereafter she appeared over the horizon.

Meantime the *Karlsruhe* had increased her speed and was rapidly approaching the other two steamers. One of them hoisted the German flag. That was the *Farn!* The other pulled and hauled on the English flag. We had to laugh!

Captain Lubinus then told us the following story: Shortly before the *Karlsruhe* came in sight a steamer appeared at the rendezvous flying the English flag. Thereupon Lubinus hoisted the English flag on the *Farn.* The Englishman hoisted his signal number "*Condor* of London" and asked the *Farn* for her name and destination which he quickly gave. Then there followed a long series of flag signals asking if the *Farn* had any war news, whether she knew anything of the English men-o'-war, etc.

When the conversation was getting irksome the *Karlsruhe* appeared over the horizon. The Englishman and the *Asuncion* had taken us for a British cruiser. The latter then took to her heels but the Britisher did not move. The *Farn* then did likewise as she had recognized us.

We could not ask for a more delightful way of capturing a steamer!

The *Condor* was an ugly ship with a poisonous-green smoke-pipe. But we looked at her with different eyes when we learned what she carried: Merchandise, especially provisions, dynamite, and 150 tons of lubricating oil. She came from New York and was bound for Chili. The captain had been warned of us and had

navigated very cautiously. He had made a great sweep to the eastward of the West Indies and carefully avoided all commercial lanes. He certainly did have rotten luck!

We were especially pleased with the lubricating oil which we could use very nicely as fuel oil. And the provisions also came in very handy, because our own stock, as well as that of our auxiliary, was getting low. The dynamite bombs were a welcome addition to our explosive bombs, which we used for sinking steamers, only a few remaining on hand at that time.

The steamer was therefore captured and all the boats we had were used to unload her. That was not easy, and it took a longer time than we had expected because the oil barrels were on top of the other cargo and had to be hoisted out of the way first. Included in the cargo was a quantity of large window panes. Fortunately we did not have to handle these carefully or there would have been no end to the work.

The crew of this steamer was also wished on the *Krefeld*. Among them were five Germans who were to be enlisted in our service.

12-13 October.—The unloading of the prize lasted the entire following day and the day after that.

After generously providing the *Krefeld* with all the provisions possible she was finally scheduled to be released on 13 October. In the course of the afternoon an officer of the steamer came aboard as representative of the English captains and their steamers' crews. He thanked our captain in their name for all the favors and the consideration shown them, both when alongside the cruiser and when aboard the accompanying ship. The captains would not fail to make reports to their government about this.

At 4.00 p. m. the *Krefeld* started for Santa Cruz de Tenerifa, where she should not arrive prior to 22 October. To celebrate the leave-taking she hoisted an especially large flag and then made a turn around H. M. S. *Karlsruhe* and the other steamers. We had our band on deck and played the piece that is usually played when German seamen part from each other: "Musz i denn, musz i denn zum Städtele hinaus." [Translator's Note: This is not pure German. Literally translated: "Must I then, must I then go away from the village?"] And then the steamer that had shared our joys and sorrows for a month and a half slowly disappeared from sight. She took our mail with her. After two months our relatives might now get some word from us for the first time.

About 10.00 p. m. we had finished transshipping the oil from the *Condor*. We could not blow the ship up because of her dynamite cargo. So we had to content ourselves with opening her valves and breaking in her side-ports. This last precaution hastened the sinking very much. At each roll great quantities of water streamed through these ports into the hull of the ship until finally the ports reached the level of the water. And then the steamer ended the struggle in a very few minutes.

The *Rio Negro* was detailed to await the finish. The *Karlsruhe* and the *Farn* had started off to coal.

14 October.—While on the way we lighted our oil-burning boiler, in order to test the mixture of lubricating oil and petroleum. The result was, on the whole, very pleasing.

15-16 October.—Not since the beginning of the war was the *Karlsruhe* so well provided with fuel as she was on 16 October when, having finished our coaling, we set off to waylay some more steamers. We had 180 tons of fuel-oil and 1500 tons of coal on board, of which 1100 tons was the best Cardiff coal. This entire load of fuel came from our prizes. The supplies, brought along by our steamers, had hardly been touched.

17 October.—When we met the *Rio Negro* the next day her captain reported that hardly 10 minutes after the sinking of the *Condor* two extremely heavy dynamite explosions took place. The steamer must have been down to a considerable depth by that time. The concussion was so strong on the *Rio Negro,* even though she was several miles away from the sunken steamer, that the compass cards jumped from their spindles.

Soon we met the *Asuncion.* This steamer had discovered the surprising but pleasing news that the Fortress of Antwerp had fallen. This must have been a heavy blow to England. All the newspapers had said that Antwerp could not possibly be taken, so now they could not minimize the importance of this victory. In spite of that, however, the English did try to do this, as we discovered later on.

18 October.—We had just reached our old place to the northward of the Island Fernando Noronha when the lookout reported a vessel in sight. We caught up with her in an hour. It was the English steamer *Glanton* of London.

"Thirty-seven hundred tons of coal from Cardiff for Montevideo for the firm of Wilson and Sons, crew English," read the signal from the prize officer. "Steamer is captured, prepare to

sink her" was the prompt reply of our captain. We did not need the coal at this time, and we had no men to spare to man the steamer.

The *Rio Negro* succeeded to the duties of the *Krefeld* and took the crew and all the provisions of the prize on board.

As the *Glanton* was rising from the sea for the last time and then disappearing to the never-to-be-seen-again regions, a second steamer was sighted and the chase began at once. But it was the Dutch steamer *Zaanland* from Amsterdam. We had no reasons for doubting her movements or appearance. The captain permitted her to proceed without even stopping her. The same thing happened to an Italian that we saw late that evening.

19-22 October.—Although we had met three steamers on this day, the next three days passed without any successes at all. The *Rio Negro* and *Karlsruhe* drifted around, engines stopped, hunting the horizon until our eyes got tired.

On 22 October, in honor of the birthday of our Empress, we celebrated by having "Sunday routine." After a short religious service the captain addressed the crew. He eulogized this Imperial Lady, mother of her country, and her devotion as leader of the Red Cross, setting a wonderful example to all German women. He reminded them also of the fact that she was a real German mother that had the same worries as other mothers had, in that she had six sons and one son-in-law, all of whom were in the field. Three spirited and heartfelt "Hurras" thundered over the deep blue depths below the equator in honor of our Empress and the Imperial Family.

On this day the result of our deeds would be spread from Tenerifa to our homes and to the entire world! Each one thought he had to remind the others of this fact.

We waited the whole day hoping for an Empress'-birthday prize. When, about 10.00 p. m., we sighted the lights of a steamer we thought our hopes had been fulfilled at the last hour. But the vessel was found to be the Swedish steamer *Atlant* of Gothenburg that was heading to the southward. We had to let her proceed, and did it without even stopping her.

23 October.—As a reward for our unsuccessful chase, the next day brought us the English steamer *Hurstdale* from Liverpool with 4600 tons of corn bound from Rosario to Bristol. She made little work for us. Just as she was half sunk and making her last efforts to resist her doom, another steamer was reported, but

this time it was a Swede. She was the *Annie Johnson* of Gothenburg. We stopped her but set her free immediately.

24 October.—Due to the arrival of our prize crews at Teneriffe, the Englishmen must now know of our operations on the northeast coast of South America, and the manner and means in which we increased our coal supply and planned our future operations. We could therefore assume that our beat which we had patrolled since 1 September would be carefully searched in the near future.

As a matter of fact, in these days we once more recognized the radio signals of the English warships which cruised in our immediate neighborhood for the first time in a long while.

When we were going south from the West Indies the captain had an idea that it would be a good thing to shake up the many English and French colonial possessions in the Lesser Antilles. He especially had in mind a joke on the French island of Martinique and the English Barbados. But at that time he had to give up these plans because he was not sure of his coal supply. Now, however, he had taken up this scheme once more. You can imagine how pleased we all were about this.

Aside from the fact that the English would now carefully search our scene of operations up to this time, there now remained but little chance of our capturing any more enemy merchant ships. The experiences of the past month had taught us that the English steamers were not using the main travel lanes very much. All of them were making great detours. The number of neutral steamers that we met increased considerably.

Therefore the captain decided to leave our old place for a while until the shipping quieted down again, and to suddenly bob up in the West Indies to carry out the aforementioned little jokes.

25 October.—We gathered all our steamers about us, *Rio Negro, Asuncion* and *Indrani.* Each one received detailed instructions for the next few weeks. Then they were released. The *Farn,* our collier, was the only one to follow us on our cruise to the northwestward.

VANDYCK

26 October.—We had proceeded a good distance away from the active lanes of travel to South America when on the morning of 26 October, to our great surprise, the lookout reported a steamer bearing east-southeasterly, steering a northerly course. When we saw her high white upper-works we knew from a distance that she was a passenger steamer. Then we recognized the colors

of the smoke-pipe—the sign of the firm of Lamport and Holt. The steamer was stopped about 11 o'clock. It was the *Vandyck,* the third largest steamer of this company, over 10,000 tons displacement and only three years old.

The daintiest morsel had fallen most unexpectedly at our feet!

In addition to 210 passengers, of which 112 were in the first or second cabin, mostly North Americans, the steamer had 130 bags of mail, $2500 of the firm's funds, a large cargo of general merchandise and about 1000 tons of frozen meat. She was bound from Buenos Aires to New York via Trinidad and Barbados.

She had been warned against us by the *Bristol.* The captain had exercised great caution in that he ran darkened at night and did not use his radio for six days. Therefore he was most surprised when our prize officer very seriously told him that we had been waiting for her since yesterday!

Her captain was an old man and he lost his balance due to this misfortune. We always gave the crews of our prizes the choice between being quartered aboard the *Karlsruhe* as prisoners of war or of signing an agreement not to take part against us or our allies during the rest of this war. If they elected the latter, we promised to set them free as soon as the next opportunity presented itself. Up to this time all the Englishmen had signed the agreement without hesitation. When this agreement was submitted and explained to the crew of the *Vandyck* the old captain made an exciting speech to his men. The prize officer found it necessary to report this to our captain. The latter immediately sent two armed men aboard the steamer to take charge of the captain. Meantime, however, his more level-headed officers had quieted him so that this measure was not necessary. This was the only case of an English captain trying to create a disturbance.

The passengers had, until the very last moment, taken us for an English cruiser. When they discovered their mistake there arose a grand howl. Because of the senseless infamy heaped upon our armies by the South American press (under English-French control) the passengers had expected the worst possible treatment and robbery at the hands of the "Huns." This madness was not confined to the between-decks passengers, who are usually of ordinary and uneducated extraction and who, therefore, may be excused because of their ignorance. Among the first-class passengers was the Columbian diplomatic representative to Argentine, a mestino, with his wife and child. He had had the foresight

to request our ambassador in Buenos Aires to write a letter to the commanders of all German warships. This he presented to our prize officer, and, shivering from head to foot, he begged that he, his wife and child, be spared! He did not subside for a long time, even after the captain had sent Ensign Count Beissel to the steamer to attend the diplomat and his wife.

When the passengers finally understood that we had no idea of hurting a hair on their heads nor of taking their property, the astonishment was great and the gratitude effusive.

In order to give the passengers ample time to pack up, the captain delayed unloading the steamer until the next day. Meantime all our henchmen were recalled by radio and they arrived one after the other. Those on the *Vandyck* were certainly surprised to see the swarm of ships floating all around.

The transfer of baggage was to commence at 6.00 o'clock the next morning. The passengers were permitted to eat one more comfortable noon meal on the *Vandyck* on the 27th. Then they were to follow their baggage over to the *Asuncion* and, along with the crews of the last three steamers, be taken to a neutral harbor.

As our provision supply, such as fresh meat, flour and rice (the last was necessary for the Chinese) had been considerably reduced, the wonderfully supplied steamer came in very handy. Therefore the next day was to be devoted to a wholesale transfer of provisions.

27 October.—During the night a part of the crew, especially the firemen, got drunk. This had usually happened in the case of the other steamers if the men were given sufficient time to save as much of their rum as they could. A drunken sailor from one of these steamers jumped overboard and it took considerable trouble to fish him out again.

Another thing that usually happened aboard the ships was the fact that as soon as a steamer was captured the officers lost control of their men. They would then besiege the captain demanding that they be paid and attempting to break into the stores, especially if they thought these contained alcohol. In several cases the prize officer had to intervene in order that their captain would be obeyed.

The first officer of the *Vandyck* had requested permission to superintend the transfer of the baggage. He and the other ship's officers behaved very sensibly, and did their best to lighten our work and to do what they could for the unfortunate passengers.

The ship's boats had been packed full the day before. Promptly at 6.00 a. m. the first officer directed that they be lowered. The passengers were watching this work and saw a most surprising spectacle: all the wooden boats of the large and new passenger steamer were leaky and soon filled with water so that all the baggage was thoroughly soaked. The suffering passengers raged. They cursed the first officer and then the captain until they were finally quieted by the officers of the *Karlsruhe,* who were watching the performance.

The German steamboat then took the heavy, wet boats in tow and, about noon, the transportation of baggage was finished.

After the noon meal the transfer of passengers to the *Asuncion* began. They were all aboard her by 7.00 p. m., including the crews of the steamers *Glanton* and *Hurstdale;* also a 10 days' supply of provisions.

The *Asuncion* was a much smaller steamer than the *Vandyck* and was not fitted to take care of so many passengers. The women and children were all assigned cabins, but as there were not enough of these, the captain and the ship's officers surrendered their rooms to them. The men had to find places on deck as best they could.

The captain had a notice posted in the salon and in the steerage. In this notice he invited attention to the lies that had been published in the press which had caused so much uneasiness among the passengers. German soldiers and sailors would never rob an unfortunate traveller of his property, much less attempt to take his life. In regard to the English, this might be the case, as they paid their naval officers and seamen prize money, that is, with the property of strangers. This custom, dating back to the days of piracy, was unknown to the German Navy. The German Navy was accustomed to doing its duty which required us to capture enemy steamers and to treat neutral passengers with every possible consideration. The only real way to escape inconveniences was to travel, not on English, but on neutral steamers.

This notice was read with interest and then widely discussed. Taken full and by, the opinions of the passengers were not bad. They accepted the inevitable in their predicament. They gave a letter to the officer who had charge of their transfer in which they thanked him for his courteous treatment: "No one with reason could expect more under the circumstances."

The presence of two American newspaper reporters was not an unfortunate thing at this time.

The women and children begged for souvenirs and especially wanted *Karlsruhe* cap ribbons and uniform buttons.

After the *Asuncion* had received our mails, Captain Fritch was ordered to take her to Para. He was to arrive there on 1 November. Captain Fritch was very sorry to have to leave us. He asked me to tell the captain that he would much rather share the joys and sorrows of the *Karlsruhe*.

The transfer of provisions from the *Vandyck* continued through the night. Shortly before midnight lights were sighted. It was a steamer heading directly for us, so that we hardly had to move in order to stop her. We were not a little pleased to discover that she was an English vessel by the name of *Royal Scepter* from London. She had noticed the gathering of ships. That pleased her so she decided to find out what was ha,pening here in the middle of the ocean. She ran straight into our arms. Unfortunately, however, she had a very valuable neutral cargo of coffee. This was estimated to be worth about 5,000,000 marks, while the steamer herself was an old and worn-out craft. The captain decided, with a heavy heart, to turn her loose. About 1.30 a. m. her lights disappeared from sight.

28 October.—Early in the morning, about 6.30 o'clock, the steamer *Vandyck* went to the bottomless depths.

THE END

29-30 October.—The *Karlsruhe* with her three remaining steamers set out for the West Indies. On both the following days the bunkers were filled from the *Farn* and, on 1 November, we filled up again. Then the *Farn* was left behind while the *Rio Negro* and the *Indrani* followed us.

2-3 November.—In addition to the jokes on the English and French colonies, the captain had decided to institute proceedings to create uneasiness in the steamer-lanes between the English Barbados and Trinidad.

The island of Barbados was chosen as the first objective. We knew that several large liners which we intended to sink would be in this harbor. Nothing would be more effective than such an undertaking to hurt the cause of England in America and the West Indies. We were all anxiously awaiting the events of the next few days. Never before was the morale on board better than

during this period. The crew had not been told as yet of our plans. But to get an idea of what the men thought let me relate the following story: My boy (servant) had been seriously ill with malaria which he had contracted in Mexico. He had just recovered from a severe attack and was released from the sick-bay. When I asked him how he felt he did not answer my question but said, "The sinking of steamers is very nice, but time is hanging heavily on our hands. It is high time that our guns got a chance to do something. That would be some diversion."

That is what all our men on the *Karlsruhe* thought.

This good humor called forth on 4 November a small feast in our mess, although there might have been another reason in that our cook had, after a long wait, finally received fresh butter, frozen poultry and other costly food supplies from the *Vandyck*. The first officer directed that red wine be served. Our mess room was decorated with the potted plants and flowers taken from the salon of the *Vandyck*.

4 November.—About 6.30 p. m., on 4 November, H. M. S. *Karlsruhe* was in latitude 10° 7′ North, longitude 55° 25′ West.

It was in the hour just preceding the short tropical twilight. The captain and the watch officer, Lieutenant (J. G.) Freiherr von Althaus, and the helmsman and signalman of the watch, were on the navigating bridge. The men had finished supper and were gathering as usual on the foc's'le to listen to the ship's band that had assembled under the bridge. The commissioned officers and the warrant officers were still at dinner in their mess rooms in the after part of the ship where were also the deck, engine-room and fire-room watches, boys, stewards and cooks.

The steamers *Indrani* and *Rio Negro* were following the cruiser at a short distance.

The first officer had just risen from the table and some of the officers had decided to leave the after end of the ship and go up on the cooler bridge, when we felt a heavy shock, followed by a dull cracking and gnashing as the ship shuddered. The electric lights went out.

The ship immediately took a heavy list to port.

Somebody in the officers' mess yelled "Torpedo hit!" This idea was mechanically conveyed from one to the other. We hurried to our battle-stations.

Before I could reach the poop, my station as second gunnery officer at "general quarters," I heard the call, "Close water-tight doors!" and the customary five short strokes of the ship's bell.

Ahead of our bow I saw the bottom of a floating ship which sank immediately. I thought it was some strange craft with which we had had a collision, even though this seemed impossible to have occurred. Actually, however, it was the forward half of our own ship.

A powerful explosion had blown H. M. S. *Karlsruhe* into halves.

The place where the explosion occurred and the immediate neighborhood, which included that part of the ship from the bow to the forward smoke-pipe, also the navigating bridge and fore-mast, must have been blown to atoms. No one saw a piece of it.

The forward part, with the majority of the crew, sank after a very few minutes. Only a few men, most of whom had been thrown a good distance away, could be saved by the after end of the ship and their boats. All of them were more or less seriously burned or mutilated.

The after end, in which all the water-tight doors had been closed, remained afloat for about 20 minutes. This fact, a glowing testimonial to our ship's material and the German construction, was the main reason we few remaining ones were saved.

The two accompanying steamers saw the catastrophe, saw a column of flame 100 meters high, and hastened to do all they could; they came up at high speed and lowered all their boats.

Our own boats were quickly lowered and assisted the steamers' boats in searching the unfortunate spot for any survivors.

After the first officer and the engineer officer on watch had inspected all the lower compartments in the ship and had made sure that there were no more aboard, the last boat, full of officers, left the ship. We had hardly gone 100 meters from the ship when her stern lifted straight up out of the water so that we could distinctly see her propellers and rudder. The boats were still hunting for swimmers, but when the rest of H. M. S. *Karlsruhe* shot suddenly down to the depths all the men in the boats gave three "Hurras!" to her and to our comrades.

Then all was quiet in our little circle. A heavy load of pain and sorrow lay upon us, and before us were the questions: How? and Why?

These questions will never be answered.

The catastrophe had befallen us so suddenly and with such force that we had no time to make clear estimates of the reasons

or results. By and by when all the survivors were assembled on the *Rio Negro* and it was seen how many of our comrades were missing, and when it was settled beyond doubt that our captain, that excellent man, honored and respected by all, had drowned with our good ship, then we all began to understand the extent of our losses and how hard this accident had hit us.

Each man on board ship had made up his mind that the end of our war cruise would come some day, and all hoped that it would be in battle with the hated enemy, proving that German patriotism and devotion are not empty words. How else could the end come?

THE RETURN HOME

The search for survivors of the sunken vessel was given up as useless on the following morning.

What should be done next?

The answer was not hard to find. There were two courses of action open to us: We had to make an effort to place ourselves and our men at the disposal of our Fatherland as soon as possible. Also we had to conceal the loss of the cruiser as long as possible. The English could not possibly know of it, Lord be praised! The excellent work of H. M. S. *Karlsruhe* had severely damaged the English trade on the North Atlantic Ocean, causing no end of uneasiness. Until the arrival of our cruiser squadron, which was very indefinite as yet, there was no other ship available to replace our cruiser. The sinking of H. M. S. *Karlsruhe* would relieve the pressure on the English and then all the results of our work would have gone to naught at one stroke. But if we were able to keep her loss a secret the uneasiness in English commercial circles would continue for another month. A considerable number of English warships were detailed to search for us, which was another advantage for our cruiser squadron.

The idea of trying to join the cruiser squadron was dropped. We were soon unanimously of the opinion that we should attempt to break through to Germany.

There were several ways of carrying out this plan. We might proceed to some neutral American harbor and then each individual could have undertaken to make the dangerous trip back home. Or we might proceed on our own steamers direct to Europe and attempt to go straight to Germany.

After a short argument we decided on the latter course. Getting back via America was very doubtful. We did not have the neces-

sary clothes. Our outer garments were so noticeable (uniforms) that we would most certainly have been recognized and interned. We also had read in the newspapers that the English did not hesitate to take German citizens and people of questionable citizenship off neutral ships. Above all, however, the minute we arrived in a neutral harbor the secrecy of the *Karlsruhe's* loss would be broken. Even if our hundred-odd men were able to keep absolute silence—past experience had taught us how difficult this really is!—we still could not expect that much of the Chinese on the *Indrani*. This last consideration decided the question.

We could now divide our crew between the two steamers. If one were captured we still had a chance for the other half to get through. Should the English capture both steamers—we were absolutely helpless!—that would have been fine business for them; and we could not begrudge them that chance.

So we decided to sink the *Indrani* as soon as we had thoroughly filled up for the long cruise. Then the *Rio Negro* steamed northward.

While underway we picked up a variety of reports, good and bad. Our cruiser squadron had won a victory over the English at Coronel; the efficient *Emden* had met her end.

As we steamed into the northern latitudes the scarcity of clothes was felt. Of course, the steamer crew helped us out most willingly as far as possible. But we were too many for them.

Our seamen made clothes for themselves out of old canvas and woolen coverlets. The results, however, were more apparent than real; the men looked picturesque, some like characters in fables, some like comedians, but all froze just the same.

We had decided to head for Norway and wait there until we picked up some reports and news (for instance, concerning the English watch in the North Sea and the Skagerrak) and then act accordingly, *i. e.*, whether the individuals would proceed home overland via Norway and Sweden, or whether we would take our steamers on in to Kiel or Wilhelmshaven.

Not having received any important reports, and without having sighted a single enemy vessel, we arrived at a Norwegian harbor in the forenoon of 29 November after a journey of practically four weeks.

We had broken through! The English blockade lines were behind us. Were the efficient Britishers asleep? Or was it the bad weather and the high seas which we experienced that were

too much for their famous seamanship? All our dreams of the barbed-wire fences around English prison camps had vanished.

I chose to continue my journey overland with Ensign of Reserves Eyring. There was always danger that the steamer *Rio Negro* might be taken on the last leg of her cruise. It was not possible for our men to make the overland trip in their clothes without exciting suspicion, so they had to be taken along on the steamer.

I wanted to make sure that I would safely reach home with the most important reports, especially my war diary which, except for a few official papers that I was able to rescue on 4 November, constituted the only record of the cruise and fate of the *Karlsruhe*. On 4 December, a beautiful sunshiny winter day, the two of us arrived on German territory at Sasznitz and were arrested by the first German landsturmer that we met.

A few days later we heard the good news that the *Rio Negro* had dropped anchor in German territory.

ROSTER OF OFFICERS ON H. M. S. *KARLSRUHE*

Order of Seniority	Rank	Name	Duties and Other Remarks
1	Commander...	Erich Köhler.....	Commanding. Died 4 Nov., '14.
2	Lieutenant	Studt.....	1st Officer.
3	"	Thierfelder.....	Navigator. Later commanded "Kronprinz Wilhelm."
4	Lieut. (J. G.)..	v. dem Borne.....	Gunnery Officer.
5	" ..	Aust[1].....	Adjutant.
6	" ..	Wilhelm Schröder.	Torpedo and Prize Officer.
7	" ..	v. Althaus.....	Radio Officer. Died 4 Nov., '14.
8	Ensign.....	Kurt Schwarz.	
9	"	Vanselow.	
10	"	Dittmer.	
11	"	Count Beissel v. Gymnich.	
12	"	Eyssen.	
13	Eng. Lieut.....	Grabe	Chief Engineer.
14	Eng. Lt. (J. G.)	Merk.	
15	Eng. Ens.....	Beck.	
16	Lt. (Doctor)...	Warnecke	Ship's Doctor.
17	Pay Lt. (J. G.)	Meinhardt.....	Ship's Pay Officer.
18	Lt. (Reserves)	Frese.....	Rec'd from "Kronprinz Wilhelm."
19	Ens. "	Eyring.....	Rec'd from 'Kronprinz Wilhelm."
20	" "	Hentchel	Rec'd from "Kronprinz Wilhelm."
21	" "	Hoppe.....	Temporarily aboard from auxiliary cruisers.
22	" "	Gundlach.....	

[1] Author of this book.

LIST OF STEAMERS CAPTURED BY H. M. S. *KARLSRUHE*

No.	Name of Steamer	Flag	Displacement. Registered Brutto tons	Character of Cargo	Value of ship in Marks[2]	Date of Capture (1914)	Remarks
1	Bowes Castle ...	English.	4,650	Saltpeter and silver metal .	1,500,000	18 Aug.	Crew landed at Maranhao, Brazil, on 2 Sept., '14.
2	Strathroy.....	"	4,336	6,000 tons coal.....	816,000	31 Aug.	Crew landed by "Krefeld" at Teneriffe on 22 Oct., '14.
3	Maple Branch...	"	4,338	2,000 tons mdse. and live stock.	918,000	3 Sept.	Same.
4	Highland Hope .	"	5,150	Ballast (refrigerating plant)	1,428,000	14 Sept.	Same.
5	Indrani.....	"	5,706	6,700 tons coal.....	1,264,000	17 Sept.	Same.
6	Cornish City....	"	3,816	6,400 tons coal.....	693,600	21 Sept.	Same.
7	Maria.....	Dutch (English Charter).	3,804	Wheat.....	?	21 Sept.	Same.
8	Rio Ignassa.....	English	3,817	4,800 tons coal.....	612,000	22 Sept.	Same.
9	Farn.....	"	4,393	7,000 tons coal.....	877,200	5 Oct.	Entered San Juan de Porto Rico under German prize crew, 12 Jan., '15.
10	Niceto de Larrinaga.....	"	5,018	8,000 tons fodder, corn, oats, machinery parts.	1,264,800	6 Oct.	Crew taken to Teneriffe on "Krefeld."
11	Lynrowan.....	"	3,384	5,000 tons corn, sugar, tallow, hides, 12 automobiles.	591,600	7 Oct.	Same.
12	Cervantes.....	"	4,635	4,500 tons fodder, wool, sugar, furs.	714,000	8 Oct.	Same.
13	Pruth.....	"	4,408	3800 tons saltpeter. 2300 tons barley.	?	8 Oct.	Same.
14	Condor.....	"	3,053	Mdse. including dynamite and 150 tons lubricating oil.	408,000	11 Oct.	Same.
15	Hunstdale.....	"	2,752	4600 tons corn.....	?	23 Oct.	Crew taken to Para on "Asuncion."
16	Glanton.....	"	3,021	4000 tons coal.....	?	18 Oct.	Same.
17	Vandyck.....	"	10,328	Mdse. and 1000 tons frozen meats.	4,896,000	26 Oct.	Also had 210 passengers on board.
		Total	76,609	More than	15,984,000		

[2] About 20 cents.

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

COMMON SENSE IN WAR[1]

By SPENSER WILKINSON
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There have been of late discussions on the subject of the proper use to be made of the fleet, discussions which reveal uncertainty about the aim and scope of naval warfare. The report of the Dardanelles Commission disclosed uncertainty of this kind among those who, during the term of the late government, had authority over the conduct of the war. That the functions of the fleet should be a matter of doubt, especially in high quarters, is nothing less than a national danger, for a mistaken employment of this powerful and costly force might lead to defeat and even to the collapse of the cause of the Allies and of the British Empire.

The objective of a navy is the enemy's navy. This fundamental principle was laid down independently of each other by the two clearest thinkers who have written systematically about naval warfare, by Admiral Philip Colomb in his "Naval Warfare," and by Captain Mahan in his "Influence of Sea Power upon History." In the judgment of these two writers, so long as a hostile navy exists, no objective other than that navy can be pursued, except at a hazard which ought not to be run. What does a man mean when, speaking of war, he refers to risks that ought not to be run? Is not war made up of danger, of risk, of hazard? How are we to know what risks are to be taken, and what not? That there is a line to be drawn is shown by the opinion of the masters of the business. "Do not imagine," wrote Nelson, on the 2d of July, 1804, "I am one of those hot-brained people who fight at an immense disadvantage without an adequate object." "Battles ought not to be given," wrote Napoleon, on the 21st of August, 1809, "unless one can reckon in one's favor 70 chances of success out of 100." In other words, the general or the admiral who

[1] Reprinted by consent from *The Nineteenth Century and After*, September, 1917.

of his own accord engages in battle without a reasonable certainty of success does not know his business. An attack of ships upon forts is an operation which naval writers regard as tabooed. It is an improper use of tools. It is employing ships for a purpose for which they are not suited. A ship is like an eggshell full of men and machinery; a comparatively small number of hits by great projectiles will sink it, a sufficient number of explosions of smaller projectiles will cripple the machinery and disable the greater part of the crew. A ship offers a large, visible and vulnerable target. Fortifications on land are made to stand a great deal of pounding, even by heavy projectiles. A land battery offers a target only a few feet high, difficult to distinguish and very hard to hit. It may be hit a great many times without damage to the guns, which will probably be invisible and almost impossible to locate. Accordingly, the damage which may be inflicted on the fort is quite incommensurate with the loss which will probably be suffered by the ships. Common sense, therefore, suggests that the experiment should not be undertaken. Its most probable result is that a number of ships and men will be lost for nothing, and the consequence is likely to be not only defeat in the engagement but the loss of forces which might, had they been preserved, have turned the balance in some sea fight upon which the issue of the war possibly depends. The risk which ought not to be run is that of losing not only the battle but the war.

The attack by ships upon forts being forbidden by common sense, it seems incredible that any government should order such an operation. Yet this tabooed experiment was three times undertaken by the late government. The result of these and of subsequent operations was so disastrous that Parliament took the extraordinary step of passing an act which ordered a commission to inquire into the origin, inception and conduct of the operations in and about the Dardanelles, and which enjoined the publication of the commission's report. The first installment of the report had the effect of emphasizing the doubt in the public mind concerning the fitness of the organization of the government for the conduct of the war. But it did not relieve the doubt by the suggestion of a better system, so that the problem was not solved. The commissioners began their report by pointing out that they would exceed the scope of their functions if they were to examine the measures necessary to remedy the administrative defects revealed

by their inquiry. They ended it by the suggestion that any member of the public who might read the report should draw his own conclusions. This was probably the right course for a commission, which has neither the machinery of judicial procedure, inasmuch as those whose conduct is the subject of the inquiry are not represented by advocates, nor the peculiar kind of skill which is the qualification for scientific investigation. Moreover, the commission is still at work, and its report is far from complete. Yet what the nation needed and desired was to discover the defects in its system of government for the purpose of carrying on the war, and the remedy for those defects. I venture then to ask the reader to accompany me in accepting the commission's invitation to use the materials supplied in its report in an attempt to find out how the mistake came to be made, and how such mistakes can be prevented.

In every war all the important decisions are made by the supreme executive authority, which is responsible to the nation for them. It stands or falls by success or failure in war, naturally enough, for the nation stands or falls by the issue of a war, an issue for which it always holds its government responsible. Everyone else simply obeys the government. In our constitution the executive power, vested in the King, is exercised according to the advice of the Cabinet, and for that advice, which means for every act of each member and of all his subordinates, the Cabinet is responsible to Parliament. There are thus only two responsibilities, that of the Cabinet to Parliament, and of every official, including every single Minister, to the Cabinet. The decisions that fix the size of the army and navy, that determine how much of the army or navy shall be used in each theater of war, who shall command each portion, and what mission he is to fulfil, are decisions of the Cabinet as a body. But these decisions, taken together, constitute the conduct of the war. None of them is ever taken except with the sanction of the Cabinet, and if any of them were challenged in the House of Commons and condemned by that body the Cabinet would fall.

How, then, can a Cabinet rightly decide such technical questions as the number of battleships, or of divisions, to be kept, the choice of theaters of war, of objectives and of commanders, and the force to be placed under the orders of each of them? Just in the same way as a man decides his own affairs when they involve professional skill. He chooses a doctor, a surgeon, or a lawyer; listens to what the professional man proposes, and then decides to the best of his common sense whether he will take the medicine, consent to the operation on his child, or proceed with the action in chancery. The Cabinet in the same way considers the suggestions made by its generals or admirals, and decides to adopt, to reject, or to modify them. The members of the Cabinet have to make up their minds as best they can as to the skill of their naval and military

officers, and to back their judgment about them and their ideas by staking the national existence on the issue.[2]

The usual practice of a large committee is to have any important branch of its work prepared by a special sub-committee. When war broke out in August, 1914, the pre-existing arrangements had been thrown out of gear, partly by troubles arising out of Irish affairs, and partly because the principal military officers were told off to the expeditionary force which was sent to France. But new arrangements were quickly improvised, by which business connected with the conduct of the war was entrusted to two sub-committees. One of these, called the War Council, consisted of 12 members, of whom seven were members of the Cabinet, and the others were Mr. Balfour; the First Sea Lord, Lord Fisher; Admiral Sir Arthur Wilson; the chief of the Imperial General Staff, Sir James Wolfe Murray; and the Secretary, Lieutenant Colonel Sir Maurice Hankey. This War Council is perhaps not quite accurately described as a sub-committee of the Cabinet, because a minority of its members were not Cabinet Ministers. But for practical purposes the distinction does not matter. For the War Council the business was prepared by a small sub-committee, a triumvirate, composed of the Prime Minister, Mr. Asquith; the Secretary of State for War, Lord Kitchener; and the First Lord of the Admiralty, Mr. Churchill.

This triumvirate was a close approximation to the ideal arrangement for the management of a war. In 1892 Sir Charles Dilke and I, in an essay which represented the results of our joint study of "Imperial Defence," reached the conclusions that

> the first requirement of a sound system is a general who can be entrusted with the duty of advising the Cabinet upon the conduct of war, and with the actual management of campaigns. To have such an officer is indispensable, for it is an elementary truth that war can never be well conducted by a committee. . . . . Any satisfactory Admiralty system will provide a competent naval adviser for the Cabinet. . . . . We attach the highest importance to the common action of the military and of the naval authorities in the consideration of Imperial defence. We doubt, however, whether it will be possible to secure unity of design in defence so long as the War Office and the Admiralty are separately represented in the Cabinet.[3] The difficulty would be overcome if it became the practice for one Minister to hold both offices.

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[2] *Westminster Gazette*, May 29, 1915.

[3] This refers not to the professional advisers but to the political heads of the two existing offices.

Our great object was, if possible, to put before those who had charge of the national affairs a conception of defence which embodied views as to which there was full agreement between those who had devoted special attention to the subject. The passages just quoted proved to fulfil this condition, and in February, 1894, a memorandum was sent to the leading statesmen of all parties bearing the signatures, not only of the authors of "Imperial Defence," but also of General Sir George Chesney and Mr. Arnold-Forster, at that time the most eminent representatives in Parliament of the effort to induce the nation to make reasonable preparation for possible conflict. The substance of that memorandum was the following passage:

> In order to secure the special consideration by the Cabinet of national defence as distinct from and superior to the administration either of the navy or of the army we would suggest the appointment of one and the same Minister to the two offices of Secretary of State for War and First Lord of the Admiralty, or the amalgamation, with the consent of Parliament, of these two offices.
>
> We would further suggest that the Cabinet should select for each service an officer whose professional judgment commands its confidence, to be at once the responsible adviser of the Cabinet upon all questions regarding the conduct of war so far as his own service is concerned, and the principal executive officer of that service.
>
> We understand by a responsible adviser one who stands or falls by the advice which he gives. He would, of course, have at his disposal, in the formation of his views, the best assistance which the professional staff of the navy or of the army could supply. But the opinion which, after mature consideration, he would submit to the Cabinet and formally record, would be his own, and would be given in his own name.[4]

The objects proposed by the authors of this paper were, first, that the Prime Minister himself should attend to the national business of the preparation and conduct of war and, secondly, to find some means of securing that the principles of war should be constantly kept before him.[5] He was to have the best pro-

[4] "Imperial Defence." 2d Edition. Appendix II.

[5] I use the phrase "principles of war" because it was a favorite expression of Napoleon's throughout his career. Sometimes he spoke of the "high" or "sublime parts of war" and sometimes of "my system." Of all these terms the modern name is the theory of war. What the theory of war is and what service it can render to the nation I discussed in a lecture delivered at Oxford in February, 1916 (published under the title "The Way to Victory" by Messrs. Constable and Co.), to which I venture to refer readers interested in a subject which cannot be properly treated in the space here at my disposal.

fessional advice, of which the only possible meaning is that his advisers should be exponents of the principles or theory of war. Everything depended, of course, upon the distinctness with which each of these advisers should realize that his function was to be the representative of the theory, or, in other words, of the knowledge and experience of which the Great Staff, in the one case of the Admiralty, and in the other the War Office, must needs be the repository.

As a fact, the War Office and the Admiralty were in full possession of the theory and of its application to the problem of the Dardanelles, which was indeed familiar to all persons who had paid any special attention to the subject. The Dardanelles, the Bosphorus, and the Gallipoli Peninsula are among the famous places of the world, familiar to readers of history and travels. In 1807 a British fleet made its way through the Dardanelles past the forts, and reached Constantinople. There the admiral found himself unable to do anything against the city, and reluctantly made his way back through the Dardanelles, with heavy loss. In 1836 the Dardanelles were surveyed for the Sultan by a Prussian captain, von Moltke, who expressed the opinion that, if the forts were properly armed, no fleet could ever pass them, and that to land an army and take the forts in rear would be far from easy. This opinion was well known, for its author was afterwards the greatest general of the nineteenth century, and his account of the Dardanelles was published in a popular and widely read volume. In 1896 professional opinion on the subject was summed up as follows:

> It would not be difficult to a civilized power so to fortify the Dardanelles that their passage by a hostile fleet would be impracticable, and that the works covering them would form a first-class fortress not to be taken, except after a protracted siege.[6]

In 1914 there was every probability that these fortifications had been put in order during one of the periods when the late Field Marshal von der Goltz was a pasha supervising the Turkish Army. At the end of 1914 there was a further probability that the attention of the Turkish Government had been specially directed to these forts by the brief bombardment of the outer forts carried out on the 3d of November under orders from the Admiralty given without the knowledge of the War Council.

[6] *National Review*, November, 1896.

In quite recent times the War Office and the Admiralty had more than once caused the problem of forcing the passage of the Dardanelles to be carefully studied. In 1904 Lord Fisher satisfied himself "that even with military co-operation the operation was mightily hazardous." In 1906 the General Staff at the War Office reported that "military opinion, looking at the question from the point of view of coast defence, will be in entire agreement with the naval view that unaided action by the fleet, bearing in mind the risks involved, is much to be deprecated." In September, 1914, Mr. Churchill, as First Lord of the Admiralty, ordered, with Lord Kitchener, that two naval and two military officers should work out a plan for seizing the Gallipoli Peninsula (with a Greek army) in order to admit a British fleet into the Sea of Marmora. A day or two later he received a military memorandum saying, "An attack upon the Gallipoli Peninsula from the sea side (outside of the Straits) is likely to prove an extremely difficult operation."

Thus, the two offices concerned had fulfilled their function of applying the theory of war to the particular problem with which we are concerned. The War Council appears to have been not quite so happy. In December, 1914, its Secretary circulated to the members of the War Council a memorandum, in which it was suggested that there was a deadlock in the western theater of war, and that Germany could best be struck by a blow directed in the first instance against Turkey. The report of the commission tells us that at this time the members of the War Council, apparently the professional members, were divided into two schools, one of which held that all efforts should be concentrated in the western theater of war, at any rate until it was proved beyond doubt that there was there no possibility of success, while the other held that a fresh campaign should be opened against Turkey and Austria. There can hardly be a doubt as to which of these two schools was inspired by the theory of war. Napoleon, writing at St. Helena about the campaign of 1800, said:

> A plan of campaign ought to have foreseen all that the enemy can do and contain the means of frustrating it. In this campaign the frontier of Germany was the predominant frontier; the frontier of the Riviera of Genoa was the secondary frontier. The events which might happen in Italy would have no direct, immediate, and necessary action upon the affairs of the Rhine, while the events that might happen in Germany would have a necessary and immediate action upon Italy. Consequently,

the First Consul united all the forces of the Republic on the predominant frontier.

In January, 1915, not only was the western front the predominant frontier, but it was the only frontier upon which all the forces of France and England could be united. The proposal for operations on a large scale through Turkey, attributed by Lord Fisher to Sir Maurice Hankey, and, apparently, favored by Lord Fisher himself, violated the first principle of war, which is to concentrate all efforts both in time and place.

At the beginning of 1915 the German assaults in the west had been checked. Their great attacks on Ypres had failed. But the new armies which were forming in England had not yet taken the field. In the east the Russians had the better of the Austrians, but were not doing well on the Asiatic frontier of Turkey. Bulgaria was neutral, and there was reasonable uneasiness about her possible attitude.

The bombardment of the forts of the Dardanelles was begun on the 19th of February. It was authorized by the Cabinet on the 17th or 18th of February, when "the Prime Minster conveyed to the Cabinet the unanimous decision of the War Council. It was accepted by them without question, criticism, or discussion of any kind." The decision of the War Council which the Cabinet thus endorsed without question was formed at two meetings. The first was held on the 13th of January. On this occasion

> Mr. Churchill said that he had exchanged telegrams with Vice Admiral Carden, the commander-in-chief in the Mediterranean, in regard to the possibilities of a naval attack on the Dardanelles. The sense of Admiral Carden's reply was that it was impossible to rush the Dardanelles, but that in his opinion it might be possible to demolish the forts one by one. His proposal was first to concentrate his fire on the entrance forts. After they were demolished he would proceed to deal with the inner forts, then attack from the Straits and from the sea side of the Gallipoli Peninsula. The plan was based on the fact that the Dardanelles forts are armed mainly with old guns of only 35 caliber. These would be outranged by the guns of the ships, which would effect their object without going into range.

Mr. Churchill gave details of the force to be employed, and went on:

> The Admiralty were studying the question, and believed that a plan could be made for systematically reducing all the forts within a few weeks. Once the forts were reduced the mine fields would be cleared, and the fleet would proceed up to Constantinople and destroy the *Goeben*.

Lord Kitchener thought the plan was worth trying. We could leave off the bombardment if it did not prove effective.

There was, apparently, no other speech. Lord Fisher, Sir Arthur Wilson, and Sir James Murray remained silent, and the decision was taken in the following terms: "The Admiralty should prepare for a naval expedition in February to bombard and take the Gallipoli Peninsula, with Constantinople as its objective."

The second meeting of the War Council was held on the 28th of January. The decision taken was identical with that adopted at the first meeting. So far as can be gathered from Sir Maurice Hankey's note, of which one version appears in the commission's report, and further details in that of Mr. Roch, Mr. Churchill advocated and Lord Kitchener supported the measure proposed. The arguments used are recorded as follows:

Among the advantages claimed for it were that

(1) It would cut the Turkish Army in two.

(2) It would put Constantinople under our control.

(3) It would finally settle the attitude of Bulgaria and the whole of the Balkans. (This appears to have been said by Lord Grey.)

(4) It would give us the advantage of having the Russian wheat, enabling Russia to resume exports (this would restore Russian exchanges which were falling owing to her inability to export, and causing great embarrassment).

(5) It would open a passage to the Danube.

(6) If successful, its effect would be equivalent to that of a successful campaign fought with the new armies.

(7) One merit of the scheme was that if satisfactory progress was not made the attack could be broken off.

Mr. Balfour, in dwelling upon the advantages which would accrue from a successful attack on the Dardanelles, concluded by saying that "it was difficult to imagine a more helpful operation." Mr. Churchill then said that the naval commander-in-chief in the Mediterranean had expressed his belief that it could be done. He required from three weeks to a month to accomplish it. The necessary ships were already on their way to the Dardanelles. The real difficulties would begin when the outer forts had been silenced, and it became necessary to attack the Narrows. . . . . He explained the plan of attack on a map.

Nothing more was said relevant to the operation. The project was not criticized, and all the naval officers were silent.

It is quite intelligible that those members of the council who had had no training in the science and art of war should be impressed with what was said at these meetings. Mr. Churchill's speech on the 13th, giving the views of Vice Admiral Carden, must have seemed, in the silence of the admirals present, to represent the professional opinion of the navy. There was no one to tell the council that the notion of the naval guns demolishing the forts while out of range of them was in flat contradiction to the views of coast-defence officers, which seem to have been represented in the War Office paper of 1906. The silence of the admirals was taken to imply approval, and rightly so, for all the non-professional members had been members of the Committee of Imperial Defence, where it was well understood that the silence of a naval or military officer implied concurrence with the view expressed by his political chief. The political members might perhaps discount Mr. Churchill as one of their own class. But he appeared to be speaking for the Admiralty and to represent the naval judgment; above all he was warmly supported by Lord Kitchener, whose force of character and great reputation lent immense weight to whatever he said. Thus the plan was carried without criticism, and no one seems to have noticed that of the seven advantages claimed the seventh was not very promising, and the other six were chickens that could hardly be hatched before the taking of Constantinople, a feat that no one can have thought likely to be accomplished without an army. The naval officers who were present have subsequently been examined by the commission and have excused their silence on the ground that it was not their duty to express disagreement with the First Lord of the Admiralty. But in that case what was the use of their presence? What was its object if not to ensure that the theory of naval war in its application to the plan proposed should be brought home to the political members? What escape have they from the dilemma that either they had not mastered the subject, or, if they had, had sat silent while a wrong decision was made?

The moral to be drawn from these two meetings is that the direction of the naval and military forces of the Crown cannot safely be left to a committee of political leaders, however distinguished, without an adequate guarantee that before they make a decision they will have had before them an analysis based upon a sound theory of war, naval or military.

It remains to examine the working of the triumvirate, in which the Prime Minister's function was to keep his mind open to the military and naval judgment of which the Secretary of State for War and the First Lord of the Admiralty were the official exponents. The cases of these two officers were not identical. Mr. Churchill, not being a naval officer, could have no judgment of his own on naval matters entitling him to a voice in the council. His proper function was to be the mouthpiece of the Admiralty. The organization of the Admiralty had, since 1894, been modified for the purpose of securing sound strategical advice to the government, and the order in council regulating its business had added to the other duties of the First Sea Lord the function of strategical adviser to the government. He had subsequently been provided with a special staff to assist him in the performance of this function. These arrangements imply a specific and formal mode of procedure. If they meant anything it was that naval opinion should be ascertained, formulated and transmitted to the First Lord by the First Sea Lord and by no one else. He might ask for or receive help from his subordinates and call upon them for information or opinions. But every paper would pass through his hands, and if forwarded by him to the First Lord would bear his endorsement. For the purpose of the war the Board of Admiralty was superseded by a "War Staff group," of which the First Sea Lord was the professional head. Indeed, Lord Fisher's authority at the Admiralty was so strong as to amount to a dictatorship against which a protest was afterwards made by the other Sea Lords.

Yet the commission's report reveals Mr. Churchill directly obtaining opinions from a number of Lord Fisher's subordinates and taking just so much of them as suited his own views. No one who reads the commission's report can doubt that, so far from trying to ascertain what the best naval opinion was, Mr. Churchill exerted himself to obtain opinions favorable to his plan and to make the most of them. Sir Henry Jackson, for example, agreed with the proposal for an experimental bombardment of the outer forts, but did not wish to go further until the results of this attempt were seen. He deprecated any attack on Constantinople by the fleet. His was one of the judgments considered by Mr. Churchill as favorable to the project, but it certainly did not justify an operation "with Constantinople for its objective."

It is well within the mark to say that Mr. Churchill was not a channel through which the naval judgment could reach the Prime Minister undistorted.

The official position of the Secretary of State for War had long been that of a channel between the military judgment of the War Office and the Cabinet. For many decades the Secretary of State had been a purely political personage, and the War Office was reorganized in 1904 in order to provide him with a strategical adviser, the Chief of the Imperial General Staff, assisted by a special subordinate, the Director of Operations. But the appointment of Lord Kitchener made an end of this system. Lord Kitchener had the rare distinction of "being himself, alone." The opinions he expressed were his own; they were not representative. During an active career he had been occupied chiefly in administration, for the most part in the east, so that he was unfamiliar with British institutions at home, with the modern organization of the War Office and the army and with the Territorial Force, which he mistakenly treated as inferior to levies which were raised under the name of "new regulars," so that the unique opportunity of embodying all the forces into a homogeneous army was lost. He had never been a great student of war, and his experience in the field was confined to the African campaigns in which he made his name. His views were those of a shrewd good sense little tinged by science, theory or system. The commission was told that he "acted as his own Chief of Staff"; in other words, he ignored the War Office except as the instrument of his wishes. Thus he was the last man to convey to the Prime Minister the information or the military opinions that had during 10 years of devoted work been accumulated by the General Staff at the War Office. Sir James Wolfe Murray, in January, 1915, Chief of the General Staff, had held that office for only a few months and could not be in a position to express opinions independently of such a Secretary of State as Lord Kitchener. Lord Kitchener's share in the purely naval attack on the Dardanelles can be briefly told. On the 2d of January, 1915, a telegram was received from Petrograd asking for a demonstration to draw off the Turks from the Caucasus. Lord Kitchener saw Mr. Churchill and sent him a note saying:

> I do not see that we can do anything that will seriously help the Russians in the Caucasus. . . . . We have no troops to land anywhere.

. . . . The only place that a demonstration might have some effect . . . . would be the Dardanelles.

Next day Lord Kitchener telegraphed through the Foreign Office a reply to Petrograd promising that a demonstration would be made. Lord Kitchener's attitude at the War Council has been described and it is evident that his opinion favorable to the plan made a strong impression on the Prime Minister. But light is thrown upon his position by a paper which he read to the War Council in May, 1915:

When the Admiralty proposed to force the passage of the Dardanelles by means of the fleet alone, I doubted whether the attempt would succeed, but was led to believe it possible by the First Lord's statements of the power of the *Queen Elizabeth* and the Admiralty Staff papers showing how the operation was to be conducted. . . . . I regret that I was led to agree to the enterprise by the statements made, particularly as to the powers of the *Queen Elizabeth*, of which I had no means of judging.

But the Secretary of State for War had every means of judging whether the *Queen Elizabeth's* or any other ship's guns could alter the conditions of naval attack on forts, especially in the narrow channel of the Dardanelles. The papers existing in the War Office, to which reference has already been made, gave him all the means needed.

My endeavor has been to find out the exact nature of a failure in the work of a government. That has involved an examination of the action of distinguished men. But it is not hostile criticism. Each of us is here to serve his country to the best of his powers. The difficulty is that the ablest men are the most overworked. While Lord Kitchener and Mr. Churchill were advising the Prime Minister about the operations of the war, each of them was also general manager of one of the largest business concerns in the world, which was expanding at an unprecedented rate. Besides that, each of them was a member of Parliament and of the Cabinet. Neither could give more than a fraction of his time to the close study of the operations of the war. Lord Fisher, as First Sea Lord, had a responsibility for a large part of the business of the Admiralty. The first condition of a clear strategical judgment is that a man must concentrate himself upon the direction of the operations to the exclusion of everything else. He must be free from other cares. Before we censure the men who have had to take the responsibility for ordering campaigns and battles by sea or land, let each of us try to imagine himself in their place. War

cannot be conducted except by men of strong will, nor without mistakes, and it has been well said that those who are afraid of the mistakes they may make never do anything. In the same way, however, those who are afraid of criticizing when the object is to find the truth may be diverted from their path. So I return to my inquiry.

I have said that the attack of ships upon forts is contrary to common sense. This statement perhaps requires modification. What common sense tells us is that the government in directing the naval and military operations must conform to, and not violate, the principles of war. But common sense unaided does not tell us what those principles are. When a portion of the fleet was ordered to bombard the forts of the Dardanelles, Mr. Asquith did not know, and Mr. Balfour did not know, that a principle was being violated. No voice was raised in the War Council to say: "What you propose to do runs counter to all the experience of wars, and everyone who knows thoroughly what can be done with ships, guns and earthworks, will tell you that ships are not made to fight earthworks, and that you are making an experiment which is morally certain to end in disaster." The defect in the system was that, in the various bodies which one after another discussed this plan until it was finally adopted, there was no one who possessed such a knowledge of what ships, guns, earthworks and men can and cannot do, under given conditions, and of the experience of past wars, as to be able to say, "This operation is a wrong use of forces, and the whole history of modern war is a warning against it," and who combined with this knowledge and the judgment resulting from it, the official and unmistakable duty of pressing that judgment upon the committee of which he was a member. If the country is to have any security that the best use will be made of the forces which, at so much sacrifice, have been placed at the disposal of the government, if it is to have a guarantee that its men, its money, and its ships will not again be thrown away in vain, either in parts or entirely, means must be taken to ensure that, before the government issues instruction either to the army or the navy, the orders proposed shall have been submitted to the scrutiny and shall have obtained the approval of someone who is master of the principles of war.

The remedial measure by which the required guarantee can be secured is not far to seek. It has been set forth in the course

of my argument and consists in adopting the principles about which there was agreement in 1894 between those who had then long examined this problem as the vital part of any national organization for war. Sir Charles Dilke, Sir George Chesney and Mr. Arnold-Forster have long been dead, as have most of those eminent naval and military officers, such as Admiral Hornby, Lord Wolseley, Lord Roberts, Colonel Charles Brackenbury, General Sir Henry Brackenbury, and General Sir Frederic Maurice, with whom we repeatedly discussed these subjects, and who, we believed, were in substantial agreement with us regarding the matters now in question, though we did not think that it accorded with the best traditions of the discipline of the services that we should seek the signature to our manifesto of any officers on the active list. It seems to me a duty not only to those who are now fighting for the country, but also especially to those with whom for many years I was closely associated in the effort to induce our statesmen to set in order the machinery of government for the conduct of war, to recall and to apply to that momentous business principles which we were agreed in recognizing as sound, and which, so far as I am aware, have never been questioned by those whose knowledge and experience gave weight to their opinion. Many years ago I endeavored to work out with as much exactitude as possible the application of these principles, first to the army, and afterwards to the navy.[1]

More than one step since then taken by successive governments was in the right direction. The creation at the War Office of a General Staff, whose chief was to be the strategical adviser of the government, and the modification of the order in council regulating the duties of the Board of Admiralty, by which the First Sea Lord was given the duty of naval strategical adviser, were approximations towards a sound method. But in each case a serious error was committed, of which it is indispensable to point out the nature. The essence of great achievement in all the higher branches of action, especially of intellectual action, is division of labor, with a view to concentration of effort. This is the basis of all good organization, both of knowledge or thought, and of action. The theory, art or science of the general direction of armies or navies in war, the science or art which is called strategy, is in its practical application one of the most difficult in the world. To master it is

[1] "The Brain of an Army," 1890; "The Brain of the Navy," 1894.

a life's effort, to apply it an all-absorbing occupation, requiring a mind as far as possible freed from other preoccupations. The man who undertakes it must be wholly devoted to it, so as to have leisure to throw his whole soul into it. He must be free from the distracting influence of irrelevant interruptions. Strategy must be his profession, for it is not a mere abstract science, it involves the application of the practical judgment, of faculties of which the full development requires action. For the fundamental impulse of the strategist is to design operations and to direct them. His mission is not administrative but executive, and in order that his execution may be as perfect as possible, he must be free from the absorbing and distracting cares of administration. The military and naval life of 99 officers out of 100 gives them neither the opportunity of practicing strategy nor the leisure to study it. The man who gives words of command to a battalion or to the officers of a ship is not practicing strategy, and as a rule has nothing to do with it. It is the constant experience of military historians and of governments that an officer who is a brilliant leader of a brigade or of a division may prove utterly incapable of the responsibility of command-in-chief, and of the two greatest generals of modern times, Napoleon and Moltke, it is almost literally true to say that neither of them ever gave a word of command in his life. When the office of Chief of the General Staff was created, its holder was made First Military Member of the Army Council, and was thus the professional head of the board which administers the army. In this way he was placed at the same time at the head of two distinct professions, that of the strategist and that of the military administrator. But no man can serve two masters, and there is no escape from the dilemma that the Chief of the General Staff may be either a first-rate administrator or a first-rate strategist, but that it is hardly possible that he can be both at once.

When the duty of strategical advice was given to the First Sea Lord, that officer was the professional head of the whole naval administration. He was the senior member of the Board of Admiralty, and all important questions arising in the departments of his colleagues were submitted to him. Upon this more than sufficient mass of business was superimposed the function of the strategist. The dilemma in which the Chief of the General Staff is fixed is imposed also upon the First Sea Lord. Moreover, the

fact that in each case two activities of a totally distinct nature are required from a single officer makes it difficult rightly to select an officer for the post. Is he to be chosen for administrative gifts or for strategic judgment? In the one case, naval or military administration, in the other, the direction of the army or navy in war will suffer. In peace, every government regards the administration as of primary importance, because the first care of a government in peace is apt to be to satisfy the House of Commons that there is no extravagance in expenditure. But in war, a nation's first need is victory, and both the design of victory and the supervision of the execution of that design are functions not of the administrator but of the strategist.

What is required is the selection for each service of an officer whose duties would be, subject to the higher authority of the Prime Minister, to draft and to issue the orders of the government to all the generals or to all the admirals entrusted with the command of fleets or armies. His duty would be to submit his plans to the Prime Minister, and through him to the Cabinet, to translate them into orders and to issue those orders. His title matters little. I think the simplest would be that of Director General of Military or of Naval Operations. He would be chosen for his strategical judgment, his mastery of the theory and practice of naval or of military operations. His occupation would be with those operations and nothing else; with the naval or military administration he would have no direct concern. He should have his own office, into which he should remove those branches of the existing War Office or Admiralty which, under the name of General Staff, have to do with the operations of the navy or of the army. He should be subject to no First Lord of the Admiralty or Minister of War, but should be in direct relation with the Prime Minister and the Cabinet. The administration of the two services would be left to the Admiralty and the War Office, each of them under an administrative officer or board, and if need be, under a Cabinet Minister, as at present. The two directors general should have their offices near to one another, so that they could readily communicate with each other.

There should be no intermediary between them and the Prime Minister. The secretariat of the Committee of Imperial Defence was instituted in 1904, with the idea that the secretary should consider all questions of defence and furnish advice. That is the

attempt to create a hybrid, a strategist who shall be at the same time a master of land and sea warfare. It is a dangerous and doubtful experiment, of which the result can only be a new dilemma. The secretary will either be a mere clerk, or he will dominate both the services, conducting the war and governing the country. In the second case it would be better that he should at once be appointed Prime Minister.

I am well aware that the objection will be raised that it is difficult to find men of the character and qualifications required for the direction of the naval and military operations. If that were true, the British Empire would be in a bad way. My answer to it is: "Seek and ye shall find," and that if in the past mistakes in the choice of men have been made, the explanation may be that those with whom the choice lay were not quite clear as to the exact nature of the qualifications needed.

The question as to the precise relations of the directors of naval and military operations to the supreme political authority of the Cabinet is perhaps delicate. On that point I am not acquainted with any discussion in the English literature of war. My own view that the military strategist should himself be a member of the government was expressed in December, 1899, on the eve of those disasters in South Africa which so startled the nation as to gain for the period when they happened the name of the Black Week. On the 14th of December I wrote:[8]

> A nation that is liable to war requires men of war in its government; and, in the case of Great Britain, the place for them is in the Cabinet. The traditional practice of having a civilian Minister inside the Cabinet with all the authority, and a soldier with all the knowledge outside the Cabinet, was devised for electioneering purposes, and not for war. The plan has answered its object very well for many years, having secured Cabinets against any intrusion of military wisdom upon their domestic party felicity. But now that the times have changed, and that the chief business of a Cabinet is to manage a war, it seems unwise to keep the military judgment locked out. Party felicity was valuable some years ago when there was a demand for it; but the fashions have changed. To-day the article in demand is not eloquence nor the infallibility of "our side," whichever that may be; the article in demand to-day is the organization of victory. That is not to be had at all the shops. Those who can supply it are very special men, who must be found and their price paid. The nation has given bail for the production of this particular article, and if it is not forthcoming in time the forfeit must be paid. The bail is the British Empire.

[8] "Lessons of the War" (Constable, 1900), p. 93.

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FORECASTS AND REALITY IN THE NAVAL WAR[1]

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I. NAVAL DELUSIONS

The War of the Nations gives the outward impression of a revolution rather than an evolution in methods of naval warfare. To speak frankly, the impression seems widely current among people of intelligence that the war has quite discredited the science of naval warfare as propounded prior to 1914; while a large part of the general public are persuaded that it has demonstrated the failure of navies. One of the advantages supposedly inherent in sea power was the ability to transport troops to strike the enemy at his most vulnerable points. If the Dardanelles campaign had succeeded it would indeed have constituted a most obvious proof of the direct influence of sea power upon the course of the war; on the other hand, a superficial examination of the actual situation might appear to justify the opinion expressed several years ago by one of our army writers in confuting the well-known book by Callwell: "Sea power, while often useful, may sometimes be harmful, leading to erroneous diversion and useless scattering of land forces." Notwithstanding the enormous superiority of the Allied fleets over those of our adversaries, the former cannot count to their credit any striking and conspicuous achievements, which may be confidently proclaimed as notable contributions toward the attainment of our objectives in the war. If the inability of Germany to hold her colonies must be conceded as due to naval power, still it is always possible to apply the words of Napoleon in an analogous situation: "Pondicherry may be reconquered on the banks of the Vistula."

Two fundamental advantages accruing to the Allies from preponderance of sea power are the absolute interdiction of enemy

[1] From the *Rivista Marittima*, August, 1917.

trade and the maintenance of our own maritime communications, making it possible to continue the struggle as long as necessary, with land forces steadily augmented, and to carry supplies wherever needed, until in the end we may impose our will on the enemy.

The sceptic will suggest, however, that while the first of these advantages undoubtedly bears heavily upon our adversary, its ultimate efficacy must not be exaggerated. Mahan, in the introduction of his classic work on *The Influence of Sea Power,* in order to demonstrate the effect of cutting off the sea trade of a country in which it is intensively developed, cites, as a typical example, Holland in the disastrous 18 months' war with England in 1653-54; the Zuyder Zee became a forest of masts, the land was reduced to dire misery, and Holland was constrained to a ruinous peace. But it will not do to compare Holland with the great Central Powers, rich in resources of all kinds, and strengthened, moreover, in their capacity for resistance by the occupation of important territories and by their Balkan alliances, creating, in spite of the efforts of Allied forces to break the cordon, a complex of peoples stretching from the North Sea and the Baltic to Mesopotamia.

Scepticism is evidently less justified in regard to the second advantage, that conferred upon the Allies by the maintenance of sea communications, which is for us a factor of absolutely vital importance; but it may be asserted that the means employed to protect sea trade have not measured up to the needs. Clearing the seas of isolated German cruisers and destroying at the Falklands the squadron victorious at Coronel, were indeed tangible proofs of naval superiority; but it will doubtless be said that Germany's failure here was due to the fact that in the initial phase of the war she clung to old principles, and did not, during the first seven months, have recourse to the submarine in commerce warfare.

At all events, note the way the submarine scythe has cut into the line of transports. Recent losses are indeed somewhat less than at the opening of the unrestricted U-boat campaign; transportation is now controlled to secure maximum efficiency; measures and systems of protection are steadily becoming more logical and effective; the munitions output is constantly increasing; the United States has entered the field; admitting, as we have reason to presume, that the combined effects of these measures will assure to the Entente the tonnage necessary to make up for future losses

and guarantee the prosecution of war to victory—nevertheless, judging from appearances, it would be foolish to say that in taking measures of the kind noted above the navy has played the part of protagonist in the war. The antidote for the submarine has not yet been found; protection of sea routes against the insidious foe is secured essentially by grouping in convoys, arming of merchant vessels, and escort. And, as regards this last point, it will be said that escort of merchant vessels by torpedo craft, however numerous, has a practical value somewhat like that of moral character in human affairs; while the submarine is forced to submerge, it will be asserted that it is seldom seen in time to prevent effective maneuvering for torpedo attack.

Submarine attack on communications appears, among the various kinds of naval activity, the only one that has had a direct effect upon the course of the war; and, in contrast with the very tangible way in which its work is manifested, it is difficult to appreciate the effectiveness of counter-measures.

People in the Allied countries note that the maintenance of an immense patrol force of all types requires unceasing labor, extremely fatiguing and dangerous, treachery thwarted, enemy attacks warded off, mines destroyed, unremitting vigils in home and enemy waters, difficulties hampering all these activities—and the actual accomplishments often unknown and their value unappreciated.

If we turn to consider the work of the navies as manifested in fleet actions, no one will deny that in size Jutland was the greatest naval battle in history. But the objective of the German fleet in putting to sea is still wrapped in mystery, and both sides claim tactical victory, while the ultimate effect of the sanguinary conflict upon the course of the war does not readily appear.

We have now touched upon the principal aspects of the present naval war.

Many valuable ships have been lost, through treachery, through defeat, and sometimes as a result of actions that have worked little harm to the enemy. Great is the activity of patrol boats, torpedo craft, and scouts; yet the submarine still scores frequent victims.

The submarine and the mine, if they have not paralyzed the main fleets, have still forced them to remain normally in ports well protected by nets and barriers, so that in this war their character-

istic employment seems to be *inaction;* the naval engagements have been most sanguinary, but seemingly sterile.

How can we compare this warfare with what we imagined before 1914? The logical answer seems to be that of a German writer after the first few months of war: "If we consider what has happened on the sea, we cannot suppress an ironic smile at the predictions of naval strategy; fundamental principles are overthrown, every theoretical forecast is vanity, and the totally unforeseen has become reality."

The more justified seems this irony when we reflect that while Germany herself, in her miraculous preparation for war, gave considerable attention to the development of the submarine, this development was slight as compared with what has taken place during hostilities, whether in respect to numbers, scope, or field of action. The vast submarine campaign is itself one of the improvisations of the war.

After having devoted to the fleet so large a part of our national revenues, we discover it to be a veritable delusion, or we are forced to acknowledge that means which are relatively more effective are far cheaper, *i. e.,* submarines, mines, swift torpedo craft and airplanes. Battle squadrons, in fact, might almost seem organisms tolerated merely because they exist; though in reality it is always easy to see the matter in a very different light simply by reflecting that, held in a potential state at opportune strategic points, *these squadrons serve, if in no other way, to paralyze those of the enemy, which, without the equilibrium thus established, would presumably not rest innocuous.*

While recognizing the validity of this fundamental axiom, if for no other reason than to exclude the paradoxical concept that battleships are useless, there are those who would employ it in order to draw therefrom an apparently brilliant corollary for "after the war."

Their idea is as follows: Admitting that battle fleets are necessary to offset each other, it will be seen that if no battle fleets existed, precisely the present equilibrium would still obtain. Thus, for the future, there rises the mirage of an international convention, forbidding the construction of ships-of-the-line, while leaving nations free to provide for their naval defence by other means. The mirage is most seductive, since it seems to lead by a reasonable step toward the utopia of complete disarmament.

Let us see if this idea is acceptable.

I have sought to present as logically and impartially as possible the arguments suggested by this delusion in regard to naval power; these arguments should be discussed; if their fallacy is demonstrated, they should be cast aside, lest they lead us into evil.

I shall limit myself to a few general considerations, which seem sufficient to prove that the actual effects of naval superiority are greater than appearances indicate, and sufficient also for a summary examination of the changes brought about by the war in the light of prior predictions.

II. THE CHARACTER OF THE WAR

What is the opinion of well-informed critics as to the naval action of Germany at the outbreak of war? Were the German naval objectives realized?

The First Lord of the British Admiralty stated in the House of Commons, in November, 1914, that at the opening of hostilities, England was in grave peril; "and the greatest danger was that of being surprised unprepared, with the fleet not disposed in readiness for war." Once the fleet was mobilized and properly stationed, the danger was over.

These words were not exaggerated.

At the beginning of the war (as to-day) the German fleet was considerably inferior to the British fleet in home waters; but it should not be forgotten that the quota of forces held in complete readiness in time of peace modified this difference in a sense favorable to Germany. In other words, Germany held a larger part of her fleet in permanent preparation for war; and a war opened by a surprise naval attack on her part offered better prospect of success than could be expected later on.

It is beyond question that this surprise action, the possibility of which constituted the chief preoccupation of the British, might have had serious results; aside from other considerations, now that we are in a position to appreciate the unforeseen and extraordinary contribution of England to the land war, who will lightheartedly affirm that nothing would be different in this respect if a great naval battle had at the start transposed the relative strength of the two chief fleets?

The great naval surprise was not attempted by Germany, not certainly because of unwillingness (for it would have accorded perfectly with her spirit and interests) but because of its impossibility, owing to the fact that on the very day of Austria-Hungary's ***ultimatum*** to Serbia the British Navy had carried out a complete practice mobilization, and could equip her reserve and dispose her squadrons before the outbreak of war. The weight of British naval superiority thus thrown on the scales of war, Germany was forced to avoid risking her main fleet under adverse conditions, and must await the outcome of events, seeking in the meanwhile to weaken her opponent by vigorous attacks on her navy and sea communications—" neglecting nothing," as Bernhardi wrote in 1913 (*Germany and the Next War*), " which might in any wise injure the enemy, accompanying the most ardent initiative by the boldest offensive." And this period of waiting, according to the author just cited, would continue until " at last we shall be able to challenge Great Britain on the high seas." (We shall take up later the prospect of a great naval engagement in the course of the war.)

The consequences, as we have just outlined them, which followed the prevention of aggressive naval action on the part of Germany, are in harmony with the rapid decision sought by the German armies on the western front. The battle of the Marne stopped the German invasion; but, contributing to this result, an event of not less importance was the establishment of British naval superiority in its complete efficiency, it being clear that without an initial naval situation favorable to England " the transport of troops to the Continent," according to the statement of the First Lord in the speech already cited, " would have been prevented or at least retarded "—and every one knows there was no time to lose.

From a naval standpoint, the situation of the Central Powers is exceptional; their coasts, of slight extent, are by nature and art invulnerable. *For a war of attrition, the conditions presented were ideal;* the German and Austro-Hungarian fleets had a freedom of action which it would be folly to assume in similar cases for nations very differently exposed to naval attack. Whatever their inferiority to the enemy, the problems presented to these fleets were of a purely aggressive character—it was possible for

them to run no risks and remain safely passive until the opportune moment for action. It is essential to take account of this special situation in order to appreciate the labor of the Allied fleets in the war, and *to avoid generalizations that would be completely absurd.*

The moment past when, prior to or at the outbreak of war, the German fleet might have attempted a surprise, it remained for the Allied navies to blockade the enemy fleets in the North Sea and Adriatic, capture isolated enemy vessels elsewhere, and profit by the liberty of action thus secured.

Upon the failure of the German plan for a quick decision on land, the war became long and severe; and as an effect of its increased length, the influence of naval superiority took on a value it would not otherwise have had.

In ante-bellum discussions of the effect of sea power in a possible war between the Entente Powers and the Triple Alliance, naval writers as a rule spoke too abstractly of the advantages to be derived from control of the sea; military critics correctly pointed out that these advantages would be felt only in a long war. What importance could be attributed to the isolation of the enemy from the rest of the world in a war of from two to six months?

At the maximum, the war was not expected to last more than a year. "Opinions as to the duration of the war," I find in an important work by a French writer (Captain Sorb, *La doctrine de defense nationale,* 1912), " are divided; some say the campaign cannot be ended in less than six months; other say a year; but we believe that a period of about a month will bring a decisive action, with irremediable consequences, and two months will see the situation definitely under control."

The above is cited, not from a desire to demonstrate the error of those who anticipated a short war, but simply to bring out in striking relief the discrepancy between expectations and reality as to the duration of the conflict. And what is the explanation?

Preventing the effort to separate the Entente armies at the opening of the war, sea power has enabled the Allies to increase their forces steadily, and to put in the field armies still untrained or in process of creation. To sea power also is due the fact that what Germany regarded as " the centrifugal tendencies of the heterogeneous British Empire " have been transmuted into fra-

ternal co-operation on the battlefields of Europe; and that to-day four-fifths of the world are at war with the German Empire; and finally we owe it also to the same cause that defeated armies have been saved and placed again in the field, that grave errors have been remedied, and that to-day, in spite of the tremendous upheaval in Russia, we are keeping up the war as energetically as possible, with firmest faith in the victory of our armies, and with new cards of the highest value still to put in play.

All this has been accomplished in the face of enemy efforts to thwart our free use of the sea.

In the first months of the war the destruction of commerce was kept quite within foreseen limits, in spite of the desperate assaults of enemy cruisers. "We had assumed," said Mr. Churchill, "a loss of 5 per cent of our merchant marine in the first two or three months; instead I am glad to be able to state that the losses have reached only 1.9 per cent."

When her ships designed for commerce warfare were destroyed, Germany had recourse to submarines.

In harmony with this method of attack on British commerce was the vigorous offensive toward Calais undertaken by the right wing of the German army (Oct. 17–Nov. 9, 1914), the failure of which, incidentally, was greatly assisted by British monitors hindering the movement of enemy troops along the coast and supporting the left flank of the Belgian army. Thwarted in its effort to control the southern side of the Channel, Germany made effective use of her strip of Belgian coast by establishing naval bases at Bruges and Seebrugge, the importance of which is fully recognized.

The land and sea strategy of the enemy are thus seen to have been in close correlation, such as can scarcely be said to have existed on the side of the Allies. For instance, it would have been a good example of the decisive influence of sea power on the course of the war if the Allies had found it possible, before the conquest of Serbia, to move an army from the east coast of the Adriatic to block the way to Turkey. But at that time the Allies were still far from the concept of a united front, of one war whether by sea or land, and of utilizing sea communications to checkmate the advantage of central position. The example cited is purely hypothetical, presenting obstacles which prevented its

adoption; but it may serve to fix the idea of the importance of naval supremacy as a means of carrying the attack into favorable fields; nor is it logical to depreciate this importance on the basis of the failure at the Dardanelles and the inactivity at Saloniki.

The fact remains that, in spite of the work of the submarines, an immense number of troops have been, and undoubtedly will be, transported by sea with minimum losses. Convoys with units of fair speed and adequate escort have comparatively little to fear. The heavy losses have been among the cargo carriers, making the problem here more difficult.

It is true there are reassuring signs. The losses are diminishing, in spite of the increased number of ships engaged in European traffic owing to the American alliance. The severe losses at the opening of the unrestricted campaign are not likely to be repeated, since they corresponded to a different control of traffic from that now in force, and to the combined action of all enemy submarines, the units of which must now take turns in port for supplies and refitting. The counter-measures of various kinds now employed indicate that the day is still far distant when the submarine may be said to have rendered powerless the Allied armies. The final adoption of the logical system of convoys has enabled the navies to increase their direct protection. And this will be still further increased with the application, even fuller than hitherto, of the principle of a united front and absolute community of interests.

Nevertheless, I repeat it would be absurd to deny the serious menace of the submarine; and the question may be logically asked whether, viewing the whole situation, this system of warfare has produced the results expected by the Central Empires.

In undertaking the submarine campaign, and pushing it to its extreme limit, the Central Powers virtually declared war on neutrals. While thus likely to increase the number of enemies, the measure would still be useful from a military standpoint if it operated to hasten the defeat of the Allied armies, so as to prevent the intervention of new belligerents on the battlefields of Europe. It was thus a question of time; and on the strength of the present situation it is possible to affirm that the German calculations failed.

The Entente has suffered severely from the submarine; but the offensive preparations on the western and Italian fronts have

nevertheless developed with increasing vigor, and as for the Russian front, it is impossible to attribute anarchy to submarines.

"It was planned last year," Lloyd George recently stated, "to carry out a grand concerted attack. Russia was ready as never before; the jaws began to close, but, to speak frankly, one of the parties found itself for the moment handicapped, and as a result it was impossible to secure the convergent pressure hoped for. Whatever our difficulties, we find ourselves strong and steadfast at the end of three years of war. We may say with all assurance that we would not exchange our military situation to-day for the enemy's. Let us look at the facts. What could Germany accomplish in a year in which one of her enemies, deemed the most dangerous at the outbreak of war, was virtually paralyzed by internal difficulties? We should at least expect her to defeat all assaults on other fronts. On the contrary, she has been beaten in every important battle—and these indications are not misleading."

As regards the effect of the submarine campaign on land warfare, there are evidently but two possible hypotheses. One is that the submarine has exerted no appreciable influence on the military situation. In other words, that if there had been no such campaign, the situation on the land fronts would still be practically what it is to-day. The other hypothesis is that, but for the submarine, Germany would now be conquered.

In view of the assured participation of American forces on the western front, it follows that, if on the basis of the first hypothesis the submarine has not improved the military situation, then the count is heavily against it, since it has been the cause of a powerful reinforcement to the Allies. On the basis of the second hypothesis the submarine campaign appears at best a cruel remedy, which has served to prolong the conflict, postponing an outcome the character of which was indicated when the Germans were halted on the western front.

The intensive "attrition" warfare carried on against Allied commerce has been accompanied by a similar campaign against the Allied navies, a campaign which in the North Sea has been prosecuted by every means at the enemy's disposal, including fleet actions, whereas in the Adriatic the Austrians have consistently avoided risking their main units.

Notwithstanding the losses incurred, the situation after three years of war still proves the overwhelming superiority of the Allied fleets, without regard to naval reinforcements from the United States.

Submarines, mines and aircraft have excluded the possibility (a moot point before the war) of a blockade maintained normally by a strong cruising force in enemy waters; instead, as was foreseen, the blockade is maintained *by a fleet in force at its bases.*

The Allied fleets are nevertheless blockading fleets in the true and proper sense of the word, since they are the means of completely cutting off the sea communications of the enemy, and preventing their fleets from undertaking a serious offensive or issuing from their bases without incurring battle against superior force.

This holds without disregard for the fact that, as a result of geographical conditions, the narrow seas where the Allies enforce the blockade are at a considerable distance from the enemy bases.

The situation of a blockading fleet, however superior, is obviously difficult, since it must be held in contant readiness to check an initiative undertaken by the enemy at his own selected time; hence arises the possibility that the enemy may occasionally gain a success in secondary actions, carrying out his policy of attrition. This advantage is increased in the present instance by the peculiar character of the enemy coasts, already noted, which prevents the blockading fleet from forcing an engagement.

In this situation, until the enemy fleet decides that the opportune moment has arrived to issue forth and take the chance of battle and possible destruction, the mission of the blockading fleet consists in maintaining the equilibrium. And whatever the inherent advantages in the supremacy thus secured over all the seas (except the Baltic and Black), this mission is still a thankless one, for it seems synonymous with an inertia and uselessness not ordinarily regarded as in keeping with the character of naval warfare.

In the land war, every battle has tangible results in the way of territory gained, maintained, or lost; in the naval war, on the other hand, if one fleet merely paralyzes another, forcing it to remain shut up in port for safety, or if in a battle in which losses are balanced, it gains a strategic victory (forcing the enemy to

resume a passive attitude), or even if, finally, it succeeds in inflicting a full defeat, it still seems to have made but snail's progress toward a victorious peace. Scattered over the surface of the ocean, the wreckage of battle seems to question why all these men have died; and a tragic day's work is seemingly in vain.

But let those who are thus misled simply ask themselves what would have happened had our preponderance of strength been swept away and the enemy secured freedom of action on the seas.

Those who are very rightly preoccupied to-day with the menace of the submarine, may well reflect upon what would happen if naval preponderance should pass into the hands of the enemy. In that case, we should at least have a quick proof of what the Germans might have done at the opening of the war—our sea trade would cease to exist. And how would our armies fare then? Have we sufficient iron, coal, munitions of war?

It may therefore be taken as mathematically certain that the fleet, while, owing to the enemy, its work is *silent* and *obscure*, constitutes a vital factor on a par with our armies. Nor will it be denied in the future, considering the difficulties (perfectly manageable and tolerable) that we now endure, that *this war has shown in how great a measure we depend on the sea.*

This granted, especially by those who nourish certain illusions of easy accommodation with the enemy and a return to the *status quo ante,* let us look into the fundamental principles that have led our adversaries to bring on the tremendous conflict, principles that are reflected clearly in their views on naval warfare.

Bernhardi, in the work previously cited, already foreseeing Italy's participation with the Allies, wrote as follows:

"We shall, therefore, some day, perhaps, be faced with the possibility of standing isolated in a great war of the nations . . . . and shall have to trust solely to our own strength and our own determination to conquer. This steadfast determination to win complete victory will make the next war *one of unprecedented violence.* A war fought and lost under such conditions would destroy our laboriously gained political importance, would jeopardize the future of our nation, would throw us backward for centuries, would shake the influence of German thought in the civilized world and thus check the general progress of mankind in its healthy development, for which a flourishing Germany is

the essential condition. Our next war will thus be fought for the highest interests of our country and of mankind. This will be its importance in history. *World power or downfall* will be our rallying cry. We must have the steadfast will to conquer, the iron resolution *to struggle to the end, even in the event of a lost war.*"

The facts demonstrate that the conduct of our enemy in the war has been in complete accord with these principles.

Admiral von Tirpitz, in an interview in December, 1914, in which he first threatened the employment of the submarine against commerce, complained at the feebleness of American protests against England's closure of the North Sea, and put the question: "What objection could the United States make if Germany should declare submarine warfare against the entire enemy merchant marine?" When Tirpitz spoke thus, the threat was already in process of execution, for the sinking of merchantmen by submarines had begun during the preceding October; and on February 4 (1915) following, Admiral von Pohl, head of the German Admiralty, proclaimed as a "danger zone" all the waters around the British Isles, including the Channel, upon entering which both enemy and neutral vessels would be subject to destruction without assurance for the safety of passengers or crew.

The events that followed are familiar to all. The United States despatched note upon note, but for a long time it looked as if her protests would be confined to the diplomatic field. Meanwhile, the land war failed to give Germany the results hoped for, the decisive action attempted at Verdun failed, and so the submarine campaign was pushed to the uttermost limit, without regard to the nationality of vessels attacked, the enemy thus elevating a secondary into a principal weapon, and attributing to it an importance not less than that of her armies in the field.

Thus Germany no longer considered what the United States would do; *she burned her bridges behind her,* giving to her naval, as to her land warfare a character of unprecedented violence, seeking to strike terror by showing herself ready to make war on all the world, employing every means to secure world power, wishing no compromise between that and downfall.

In striking contrast, indeed, are the indefinite peace proposals Germany has repeatedly given forth. To dispel the delusion that

people with purposes so fixed will easily renounce their aims, it is sufficient to record the words of Bernhardi: "Aspirations for peace contain an element of weakness, dissention, and indecision; their apparent humanitarian idealism constitutes their danger; they are in reality *an unhealthy utopia, or a cloak to cover intrigue.*"

Only upon a profound realization of the set purpose of our adversaries, and recognition of the fact that every show to the contrary is a device to break down our morale, are we in a position to ask what use the enemy intends to make of his main fleet.

In the North Sea, neither the prevalent foggy weather nor the multitude of units in the opposing force excludes the possibility that the Germans can secure opportunities to impose action in superior force.

Such was axiomatically the strategic principle guiding the general sortie of the German fleet before Jutland, aside from particular circumstances, as yet unknown, which may have led the Germans to leave their bases.

In the battle following, both belligerents suffered severely; but while it is needless to enter into a discussion of the tactical results, it will be agreed that the battle demonstrated the full capacity of the British fleet to execute its mission as a blockading force. After the battle the strategic situation remained unchanged—that is, the maritime supremacy of Britain was confirmed.

But it will be useful to note the proof thus afforded of the resolute purpose of Germany to pit her main fleet against her chief opponent. And in view of the fact that the guiding principle of German war policy throughout has been to utilize *all* forces to the extreme limit (even in case of a lost war), it seems by no means hazardous to affirm that the day will come in the course of the war when Germany will be led to undertake a desperate effort on the sea. Before resigning herself to decadence, she will play *all* her cards; she holds back, however, for while she is a player of extraordinary boldness, she knows that the cards corresponding to the navy are precisely the ones that must be played at the right time.

Reflection upon the importance of the naval side of the war and upon the full guaranties of success afforded by the naval predominance of the Allies, is essential to a clear vision of the certainty of our victory.

III. CHANGES IN NAVAL WARFARE

Only after bringing out by the preceding discussion the vital function of the main fleets, are we in a position to give a logical answer to the question put as the main theme of the present essay—as distinguished from delusions based on appearances, what are the substantial differences between the war as it is and the war as it was foreseen? Granted that, along with new weapons (submarine and aerial) the war has confirmed the present usefulness of old types, what changes for the immediate future are counseled by experience? May certain categories be at once eliminated?

As a result of the previous development of submarines and aircraft, it was realized before the war that great precautions would be necessary in carrying out a military blockade, and it was admitted not only that it would be folly to attempt a close blockade with the main fleet, as in the Spanish-American war, but that it would be impossible to keep the fleet within a cruising radius of about a hundred miles from the enemy bases, that is to say, within the distance considered safe when the defence was limited to torpedo craft. This development by no means eliminated the idea of blockade, but implied that the blockading force must possess well-located bases, though distant from the enemy, assuring a close patrol of enemy waters, and a sufficient number of units of varying sizes to maintain contact with a force trying to break through.

It was known that the British Navy, in harmony with this concept, and confronted by the threatening growth of the German fleet, had opportunely established bases in the north of Scotland and the near-by islands; and in consequence it was easy to presume that, to avoid division of strength, the approaches to the Straits of Dover would be closed chiefly by mines.

From the time of the Russo-Japanese War, the extensive use of mines was foreseen, especially in the North Sea, where strategic and hydrographic conditions are favorable.

Under these circumstances, there was nothing unexpected in the British Admiralty notification of October 3, 1914, announcing that, in view of German mine-laying and submarine activities, the government had authorized the mining of certain parts of the North Sea, and in particular an area of 4000 sq. km. between Ostend and the English coast.

It was very naturally foreseen that the countries whose communications were thus intercepted would exert every effort to keep up their trade by means of neutrals, and it was known in fact that Germany had in time of peace perfected an organization to that end. Yet in the beginning of the war England suffered this ostensibly neutral traffic beyond all tolerable limits, as shown by the rapid and enormous increase of imports to Scandinavia and Holland.

By those who took account of the necessities of modern warfare, it was recognized that, however inferior the enemy navy, it would be impossible to conform strictly to past standards as regards continuity and effectiveness of blockade in territorial waters, that the blockade would cover stretches of coast rather than specified ports, and that contraband would be given a wider application.

November 2, 1914, that is, a month after the mine-field notice, England proclaimed all of the North Sea a *military area,* the effect being that ships of all nationalities would incur danger in crossing a line from the Hebrides through the Faroe Islands to Iceland. Thus England seriously restricted neutral commerce, which, however, could still be carried on by following prescribed routes.

We enter the realm of the unforeseen when we pass from the action of England to that of Germany, as a result of the employment of the submarine as a commerce destroyer operating for long periods and remote from its bases.

This new system of commerce destruction, as now applied by Germany, signifies complete disregard of the consequent attitude of neutrals—that is to say, quite aside from humanitarian considerations involved, such a course of action could be conceived *only* by a belligerent who would permit no interests whatever to interfere with a possible means of injuring the enemy. Such is the course Germany has seen fit to pursue; but in a general forecast of future international provisions in this matter, it would be absurd to assume submarine warfare in its present unrestricted form as the normal recourse of the weaker belligerent on the sea. The attitude of neutrals cannot be regarded as negligible; and it follows that submarine warfare will be *tolerated only to the point where neutral states feel constrained to resist.*

With the idea of determining the extent to which the submarine as a commerce destroyer has altered naval warfare, let us assume the utmost passivity on the part of neutrals.

Let us consider in succession the two methods of employment: unlimited *"cruiser warfare,"* and *blockade of limited areas.*

It would be illogical to deny to the submarine, as to other naval vessels, the right of visit and search, the resultant situation being inevitably as follows:

Normally, the only measure the submarine can employ against enemy merchant vessels is to sink them; hence, necessarily, the merchant vessel has the right to arm for defence, to combat the enemy by any means, and to practice every stratagem to avoid destruction.

Evidently, under these conditions, the exercise of visit and search is out of the question. This was verified, in fact, by the astute German Admiralty in its notice to the United States at the opening of the unrestricted campaign: "Great Britain has armed her merchant vessels for defence against submarines, and the United States has accepted the British point of view. But under these conditions it is impossible for a submarine to approach a merchant vessel to examine her papers, since in so doing, in case the vessel is of enemy nationality, the submarine is exposed to attack by gunfire and bombs. Moreover, the enemy has advised her merchant vessels to fly neutral colors, paint out names, alter funnels, and seek by other ruses to avoid the consequences of nationality."

Neutrals being thus deprived of the guaranties inherent in visit and search, and neutral naval convoy for merchantmen being impracticable, it follows necessarily that *unlimited "cruiser warfare" cannot be carried on in a manner acceptable to neutral states.*

It will therefore be seen that submarine operations against commerce must be confined to blockade in the ordinary and proper sense of the word. And moreover, in view of the requirements of continuity and effectiveness (which cannot be fulfilled in case of submarine blockade), it is clear that, unless neutral rights are to be enormously sacrificed, the blockaded area must be not only clearly defined, but reasonably restricted. Otherwise we should fall back again into unrestricted cruiser warfare, as now actually practiced; for in immense areas such as those set off by Germany, including at first the waters around the British Isles and later large parts of the Atlantic and Mediterranean, a blockade can exist only in name.

Let us suppose that neutrals, on the basis of their assumed passivity, should make no objection to a blockade extending beyond territorial waters and applying not merely to a specified extent of coast but to the entire enemy coast-line. Let us assume the blockade zone to extend outward from the coast 20 or 30 miles; and within this zone, let us assume submarine and submarine mine-layer activities in every form.

Obviously neutrals would not consent that such a blockade should cut off straits which are necessary highways for trade between neutrals. But limiting the activities of the submarine in this manner, what may be said as to its effectiveness?

On the basis of present experience, it will be readily granted that, within these limits, in sectors having important ports as their centers, it would be possible to maintain safety routes by airplane and patrol activity of various kinds so intensified as *to make successful enemy attacks absolutely exceptional.* In fact, on the basis of this hypothesis, which assures safety to ships outside the zone, a far greater number of units would be available for the task of clearing safety routes within the zone itself.

Hence it seems logical to conclude that *submarine commerce warfare loses its capacity to exert a serious effect on warfare whenever it is carried on in a manner tolerable to neutrals.* In other words, it is simply a question whether the unrestricted warfare now carried on by Germany does or does not come under that classification.

To avoid falling into the absurdity of considering complete disregard of the attitude of neutrals as the general norm for the future, we are forced to recognize that *the method of attack on commerce which to-day constitutes the chief change in naval warfare cannot be considered as having a substantially permanent character.*

We are led to this conclusion absolutely without taking into account the anti-submarine measures that may eventually be developed. And now if we should assume submarine commerce warfare abolished, or at least reduced to an element of secondary importance, wherein lies the astounding divergence between forecasts and reality in the naval war?

In respect to changes in doctrine as to the employment of sea power, that is to say, the proper objectives of battle fleets, we encounter simply an evolution rather than a revolution of ideas,

whether in the field of strategy or tactics. The increased dangers arising from the development of more recent means of warfare have tended to limit operations to such as have a very definite character, and are of sufficient importance and sufficient prospect of success to warrant the risks taken and the extent of the force employed. This means simply that modern conditions have imposed a stricter regard than in the past for sound principles of warfare. It is of chief interest to note that large fleets of belligerents have put to sea when it was deemed necessary, have come in contact, and have engaged in heavy combat in a manner foreseen before the present development of submarines.

One of the most important teachings of the present war is the practical demonstration of the disputed principle that, for ships of the line as for other types, high speed is a factor of the greatest importance, whether from a strategical or a tactical standpoint; in this respect, *reality has abundantly confirmed the most favorable predictions.*

There was nothing unexpected in the manner in which at Jutland contact between the two forces was first established by light and battle cruisers, nor in the manner in which this led up to the engagement between the main fleets. Moreover, the decisive importance of long-range combat, as brought out by the war, has completely confirmed those principles that for the last 20 years have guided the evolution of tactics, types of ships, and methods of fire, on the basis of the axiomatic necessity of *hitting at the earliest moment* (*i. e.*, at long range) *and hard.* War experience has likewise confirmed the foreseen importance of day attacks by destroyers during contact between main forces, as well as similar attacks on the night after battle. These, among other confirmations of theory, are cited not with the idea of extended examination, but merely to emphasize the absurdity of declaring the downfall of naval principles as set forth before the war.

While particular considerations of a more technical character would be inopportune at the present time, the observation may be made that of the two chief types of armored ship—the battle cruiser and the dreadnought—it is the former whose future place must be considered more secure. Experience has demonstrated that this type of ship, aside from its essential function when incorporated with the fleet, is well adapted to supply most expeditiously and completely the protection required for remote maritime in-

terests, as illustrated by what happened at the Falklands. Its value has been brought out also under conditions prevailing in more restricted waters, whether for compelling the enemy to fight under adverse circumstances, or for getting within range before the enemy can withdraw to his base.

In long-range actions, owing to the sharper angle of fall of projectiles, ships are relatively more vulnerable on account of insufficient horizontal protection; hence some change is called for in the disposition of armor.

The increased risks encountered by ships render it desirable to apply so far as possible the principle (old rather than new) of dividing the strength of the line into numerous units, without lowering the total strength. This principle, however, should be applied with due regard to effective fire control, which does not permit reducing the number of heavy guns per ship beyond a certain limit, and with regard also to the extension of the line involved in the multiplication of units when in column at high speed.

Reasoning thus in summary fashion, the statement may be ventured that the ideal type of armored ship, under conditions to-day, should have about 30 knots' speed, 8 guns of large caliber, and armor protection considerably modified from present practice.

This by no means implies the abandonment of present types—simply their evolution, consisting in the fusion of the line battleship and the battle cruiser. (Note: This does not exclude the possible advantage of a new type of battle cruiser, supplementing the type just suggested, with greater speed and fewer big guns.) Further than this, it cannot be said absolutely that the experience of the war counsels the elimination of any category of ships now constituting the fleet.

We come back thus to the fanciful hypothesis that the abolishment of first-line battleships, in spite of technical counsels, will be accomplished by future international agreement. This, as already said, is based on the supposed equilibrium now existing between the opposing fleets. But, as we have shown, this equilibrium is far from existing in reality; for even if the present war had not presented and should not present a combat between the main forces, the fact would nevertheless remain that naval superiority has conferred upon one of the belligerents a freedom

of maritime communications which, however contested by submarines, remains an essential decisive factor in the war.

One should also bear in mind that any war, whatever its magnitude, represents a particular case; and in drawing lessons, one should not only seek a right interpretation of what actually happened, but should also consider how it may happen differently in future. Thus, even assuming (though by no means admitting) an equilibrium in this war, that certainly is not the only possible outcome of the co-existence of two opposing fleets. As a matter of fact, for a country not invulnerable to a naval offensive to the same extent as the Central Powers, and inferior to its enemy in naval strength, the assumed equilibrium would be absolutely non-existent.

In consideration of the disparity arising from unequal naval development and different possibilities of maritime defence among nations, and recognizing that against an enemy fleet defence by minor means (mines, aircraft, submarines, torpedo craft and scouts) is insufficient, we may conclude that the idea of abolishing battleships should be relegated to the realm of a perilous utopia.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE REQUIREMENTS FOR ADMISSION TO THE NAVAL ACADEMY—AN HISTORICAL REVIEW

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It is the purpose of this article to review the various changes that have taken place in the examining and selecting of candidates for the Naval Academy, and to present certain facts of interest to all friends of the navy. Aside from contributing slightly to the history of naval education, the writer hopes to assist in proving the reasonableness of the Academy's standards and the feasibility of raising the average of those who are later to become the officers and commanders of our fighting ships. The first part of the article will take up the aim and methods of the early examiners of candidates, the examination subjects in comparison with contemporary college requirements, and the various changes that have occurred, with their bearing on present conditions. The second part will show the uniform tendency of the changes in methods of selecting candidates and the possibility of improving, through better selection, the material out of which naval officers are to be made.

In 1845 the seven successful candidates were "found respectable in intellect and attainment," after being examined in accordance with Commander Buchanan's "Plan of the Naval School at Fort Severn," of August, 1845. In this he had proposed the following requirements for the admission of candidates:

Every applicant for admission to the school must be of good moral character, not less than thirteen nor more than sixteen years of age,[1] and

[1] The age of admission for candidates has varied from thirteen to twenty-two years. From October, 1845, to October, 1851, the minimum was thirteen and the maximum sixteen. From 1852 to 1855, it was fourteen to sixteen; from 1855 to 1861, fourteen to seventeen; from 1861 to 1863, fourteen to eighteen; from 1863 to 1865, fourteen to seventeen, except that enlisted boys were allowed to enter up to the age of eighteen years.

must be examined by the surgeon of the institution to ascertain if he be free from all deformity, deafness, nearness or other defect of sight, or disease or infirmity of any kind which would disqualify him from performing the active and arduous duties of a sea life. He must be able to read and write well, and be familiar with geography and arithmetic. The Academic Board will examine him on these branches, and certify to his capacity for admission into the school.

The last sentence indicates what the first superintendent of the Naval School thought should be the basic principle in examining candidates. Some years later the Academic Board [2] formulated its ideas on this important question as follows:

From 1865 to 1880 the ages of admission were fourteen to eighteen, but from July, 1864, to August, 1882, "cadet engineers" were permitted to enter between the ages eighteen and twenty-two. Some of the "acting third assistant engineers," however, were even admitted as old as twenty-three years and nine months. After the fifth of August, 1882, fourteen to eighteen years were the ages required for all candidates. Age, as well as other entrance requirements, then became the same for all candidates, and no difference was made between "cadet midshipmen" and "cadet engineers"; all after admission were thereafter styled "naval cadets." On March 2, 1889, the minimum age of admission was established by law as fifteen years, and the maximum as twenty. These were the limits until January, 1904, when the minimum became sixteen. The present requirements, it is needless to add, are sixteen to twenty, at the date and on the day of admission. The phrase in the regulations, "examination for admission," is not taken to mean the mental examination, but the physical examination which immediately precedes the candidate's taking the oath of office and being admitted into the Academy.

[2] A quaint and illuminating example of the Board's difficulties was the case of Gaza Harasrthy. On the eleventh of October, 1848, "The Academic Board met for the purpose of examining Gaza Harasrthy of Wisconsin (Hungarian by birth), a candidate for admission into the Naval School. The case of this young man was peculiar. He has brought a letter from the Hon. Sec^{y}. of the Navy expressing a strong wish for his admittance & intimating that his knowledge of the German and Hungarian languages might make amends for his ignorance in the requisite branches. He was accompanied also by his friend, the Hon. Joel B. Sutherland, who showed great anxiety in the case. The Superintendent of the Naval School had, the preceding evening (10th), sent for Prof. H. H. Lockwood, (Mr. Chauvenet being absent from Annapolis) and had expressed a wish or command, to have a special & detailed report respecting this examination.

"The examiners were Prof^{s}. H. H. Lockwood, Girault, and Jones. The candidate was found to be deficient in all the branches specified in our orders for such occasions. The Board decided not to consider the orders from the Supt. Nav. School as official, in as much as they were not made in an official form. They therefore directed their chairman

The object of this examination (for admission) is twofold, *primarily* to ascertain the *capacity*, and secondarily the *attainments* of the candidate. If he gives very clear evidence of good capacity and intelligence, it becomes unnecessary to insist upon an exact conformity to the *letter* of the regulations of the Department, requiring him to be *familiar* with Arithmetic and Geography.[3]

With a view to testing the capacity of candidates—their intellectual power rather than their attainments—they were required from 1845 to 1884 to "pass a satisfactory examination before the Academic Board." The examination was almost entirely oral, with little more than enough written work, such as writing from dictation, to test the candidates' penmanship. The personal impression counted heavily. In very much the same way, candidates for the Royal Naval College at Osborne, England, at the present time are examined before the Interview Committee appointed by the First Lord of the Admiralty. In 1875 the Register announced that "all examinations, except in reading, will be written." Although oral examinations, or personal interviews, may have ceased in 1875—so far as can be determined from the journal of the Academic Board—it was not until the fall of 1883 that the Regulations were changed. From 1884 to 1902, inclusive, candidates were examined at the Academy "by the Academic Board," in the phrase of the Registers. The first examination conducted by the Civil Service Commission, as stated by the Secretary of the Academy, was on August 13, 1901. From April 21, 1903, the regular examinations have been conducted by the Civil Service. The last examination held in Annapolis was in June, 1911.

The subjects and other details of the entrance examination were largely decided by the Academic Board until 1862. In that year

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pro tem., Prof. H. H. Lockwood, to make out the report simply in the usual form, 'not qualified', & to say to the Supt. that if he would give an official order, we would make out a special and detailed report: but that its only effect could be to show more strikingly the great deficiencies of the candidate.

Attest—GEO. JONES Sec'y." *

* Printed through the kind permission of the Superintendent, Rear Admiral E. W. Eberle, from the Record of the Proceedings of the Academic Board of the Naval School, October 4, 1845, to June 20, 1854.

[3] See Record cited, p. 48.

was enacted the provision,[4] still in force, that "All candidates for admission into the academy shall be examined according to such

[4] The act of 16 July, 1862, was revolutionary. It provided commissions on graduation from the Academy. These were given on 28 May, 1863, to the 20 midshipmen graduating that year, but were withheld from succeeding classes by a ruling of the Department. Other innovations were the title of midshipman, appointments by the President at large and from enlisted men, appointments in certain circumstances by the Secretary, and the nomination of alternates. Section 11 of the act follows. "That the students at the Naval Academy shall be styled midshipmen *and* until their final graduating examination, when, if successful, they shall be commissioned ensigns, ranking according to merit. The number allowed at the Academy shall be two for every member and delegate of the House of Representatives, two for the District of Columbia, and ten at large. They shall be between the ages of fourteen and seventeen, physically sound and well formed, and of robust constitution. They shall be examined for admittance into the Academy according to the regulations which shall be issued by the Secretary of the Navy, and if rejected shall not have the privilege of another examination for admission to the same class, unless recommended by the board of examiners. The President shall select the two from the District of Columbia and the ten at large, and the President shall also be allowed three yearly appointments of midshipmen, who shall be not over eighteen years of age, who shall be selected from boys enlisted in the navy, and who have been at least one year in the service, six months of which shall have been sea service. From and after the fifth of March, eighteen hundred and sixty-three, the nomination of candidates for admission into the Naval Academy shall be made between the fifth of March and the first of July of each year upon the recommendation of the member or delegate, from actual residents of his district, and they shall be examined for admission in July: *Provided*, That when any candidate who has been so nominated shall upon examination be found physically or mentally disqualified for admission the member or delegate from whose district he was so nominated shall be notified to recommend another candidate who shall be examined in September following. And it shall be the duty of the Secretary of the Navy, as soon after the fifth of March as possible, to notify, in writing, each member and delegate of any vacancy that may exist in his district; and if said member or delegate neglects to recommend a candidate by the first of July in that year, then it shall be the duty of the Secretary of the Navy to fill the vacancy. Midshipmen deficient at any examination shall not be continued at the academy, or in the service, unless upon recommendation of the academic board; nor shall any officer of the navy who has been dismissed by sentence of a court-martial, or suffered to resign to escape one, ever again become an officer of the navy: *Provided, however*, That no greater number of midshipmen shall be appointed by the President at large under this or any other law of Congress than shall be allowed by the provisions of this section."

regulations and at such stated times as the Secretary of the Navy may prescribe."

The first subjects that candidates were examined in were reading, writing, geography, and arithmetic, as outlined in the plan of the first superintendent.[5] The standard required was indicated in the Register of 1860, as follows: Candidates for admission "must be of good moral character, able to read and write well,—writing from dictation and spelling with correctness,—and to perform with accuracy the various operations of the primary rules of Arithmetic; viz., numeration, and the addition, subtraction, multiplication, and division of whole numbers." English grammar was added in 1862, according to the following notice: Candidates "will be examined as to the parts of speech and the elementary construction of sentences, and will be required to write an original paragraph of a few sentences."

The early requirements of the Naval Academy were apparently designed to equal, as far as was practicable, the requirements of colleges during the forties and fifties. An examination of the entrance requirements of Harvard and Yale, for instance, makes it clear why such seemingly elementary subjects as arithmetic and geography were included in the Academy's requirements. In 1845 Harvard's requirements were as follows:

For admission to the Freshman Class the candidates are examined in the following books, viz.:—

By the Latin Department in the whole of Virgil and of Cæsar, in Cicero's Select Orations, Andrews' and Stoddard's Latin Grammar, including Prosody, and in writing Latin.

By the Greek Department in Felton's Greek Grammar, Sophocles's Greek Grammar, including Prosody, and in writing Greek (with the accents).

By the Mathematical Department in Davies's and Hill's Arithmetic; Euler's Algebra, or Davies's First Lessons in Algebra to "The Extraction of the Square Root"; and "An Introduction to Geometry and the Science of Form, prepared from the most approved Prussian Text-Books," to "VII of Proportions." Also in Worcester's Ancient and Modern Geography.

The college entrance requirements of this period are indicated in the following terms of admission to Yale College for the year 1845:

Candidates for admission to the Freshman Class, are examined in Cicero's Select Orations, the whole of Virgil, Sallust, Jacobs', Colton's or

[5] J. R. Soley—History of the Naval Academy (1876), p. 57.

Felton's Greek Reader, the first three books of Xenophon's Anabasis, Andrews' and Stoddard's Latin Grammar, Goodrich's or Sophocles' Greek Grammar, Andrews' Latin Exercises, Latin Prosody, Arithmetic, English Grammar, and Geography.

The deficiency of most candidates for admission, in the Latin and Greek Grammars, Latin Prosody and Composition, Geography, and the theoretical part of Arithmetic, makes it necessary to remark, that the examination in these subjects will be strict and comprehensive. Candidates will also observe, that Arithmetic is no longer studied in College, and an examination for admission is therefore held in both the theory and practice of Arithmetic.

No one can be admitted to the Freshman Class, till he has completed his fourteenth year, nor to an advanced standing* without a proportional increase of age.

A very interesting innovation was made at the Naval Academy in 1866, when competitive entrance examinations were first held for "cadet engineers," or, as they were first called, "acting third assistant engineers." The following were the subjects: Arithmetic, algebra, geometry, rudimentary natural philosophy, elements of inorganic chemistry, English grammar and English composition, United States history, pencil sketching and right-line drawing, and the operation and uses of engines and tools. In 1870 free-hand drawing was substituted for pencil sketching. Chemistry, history, and drawing were omitted in 1871; geography was not required of cadet engineers until 1874.

In 1882 the distinctions between cadet midshipmen and cadet engineers were abolished, so that all aspirants had to meet the same

*Before 1871 the Regulations for the admission of candidates contained a provision of considerable interest; namely, that "A midshipman may be advanced to any class which he may be found qualified to join, either upon his admission or at any subsequent examination; and he may be graduated at any June examination at which he shall be found fully qualified to pass a graduating academic examination." Under this provision, two cadet engineers entered the Academy in 1867, and graduated in 1868 with the class of acting third assistant engineers that had entered in 1866. The late Admiral Mahan entered the Academy as a third classman on 29 September, 1856, graduating in June, 1859, second in his class. At the semi-annual examination, also, in February, 1852, ten members of the class that entered in 1851 were selected for advancement. Six of them, including Thomas O. Selfridge and Joseph N. Miller, graduated in 1854. Oddly enough, the first midshipmen to finish the continuous four-year Academic course, which had been instituted in October, 1851, really finished in three years. No provision for advanced standing was announced after 1870.

requirements. These comprised United States history and algebra, after 1882, as well as the original subjects, writing, reading, spelling, arithmetic, and geography. In 1889 world's history and plane geometry were added, and in 1902 punctuation. In 1905 reading, and in 1913 world's history, were omitted. During 1913-1914, it might be added, "general history" was taught at the Naval Academy. It was dropped from the curriculum after a poll of the third and fourth classes had revealed the fact that general or world's history was almost universally taught in the secondary schools of the country.

In all of these changes in entrance requirements, the Naval Academy has been held back by the standards of the public schools of the nation. It has followed, though tardily, the practice of the colleges. Algebra, for instance, was first required of all Academy candidates in 1883; but the colleges had required it for 20 or 30 years. Yale, for example, required algebra to quadratics of all candidates as early as 1846. We should note the fact, likewise, that for many years our colleges have not required arithmetic or geography for entrance, but have for many years required fairly wide reading in literature, a good knowledge of general history, a knowledge of civics and the Constitution, and a fair command of at least one foreign language besides Latin. Our secondary schools, moreover, with few exceptions, offer courses in conformity with these requirements.

The subjects now required by the Naval Academy, according to the regulations of the Secretary of the Navy, are spelling, grammar, geography, United States history, arithmetic, algebra, and geometry. For none of these does the candidate need special coaching, unless his secondary training has been weak in the fundamentals of English and mathematics. Certain changes, however, are now being formulated by a special board appointed by the superintendent with a view to bringing the Academy's entrance requirements more into the educational currents of the country.

So much for the examining of candidates. The ideal, from the first, has been to test the candidate's intelligence or "capacity" rather than his acquisition of facts, his ability to "make good" in the Academy rather than his "cramming." Requirements have been increased as fast as the standards of the secondary schools have been raised so as to include subjects, like reading

and writing, that must be mastered by every naval officer, and still ought not to burden the Academy's curriculum. In a period when colleges were receiving boys of fifteen who knew a little Greek, Latin, arithmetic, grammar, and geography, the Naval Academy accepted boys of thirteen who knew the three R's, reading, 'riting, and 'rithmetic; who were "able to read and write well, and to perform with accuracy the addition, subtraction, multiplication, and division of whole numbers." Both colleges and Academy have increased their requirements; but the Academy has not been allowed to keep pace with the colleges.

Many criticisms[1] of the Academy and its entrance requirements have not been well founded. There are some facts in connection with the entrance examinations that ought to be understood before judgment is passed. The practice has become rather frequent in recent years of allowing all applicants from some districts, without any preliminary test, to take the Academy's entrance examinations in competition with each other for the appointment. Some-

[1] Most of the reports are inaccurate, that the entrance examinations are too difficult and that only a small fraction succeed in passing. The results of candidates' examinations for the last five years have been as follows:

	Examined	Rejected	Accepted	Percentage Accepted
1913, February	135	64	71	52.59
April	591	381	210	35.53
June	303	228	75	24.75
1914, February	127	59	68	53.54
April	543	286	257	47.15
Enlisted	115	110	5	4.34
1915, February	200	105	95	47.5
April	520	320	200	38.46
Enlisted	55	44	11	20
1916, February	227	128	99	43.61
April	1216	763	453	37.25
Enlisted	66	43	23	34.84
July	350	255	95	27.14
1917, February	274	111	101	36.86
April	727	331	293	40.64
Enlisted	18	14	4	22.22
June	1417	1039	376	26.55
Total in five years	7134	4311	2823	39.57*

* For help in obtaining this and other information the writer gratefully acknowledges his indebtedness to Mr. P. H. Magruder, Secretary of the Naval Academy.

times only one out of a dozen succeeds in passing, with a perceptible lowering of the general percentage of successful candidates. In June, 1917, for instance, out of 120 candidates nominated thus for examination, only 17.5 per cent passed. Out of the total of 1417 candidates in that examination, 26.55 per cent passed.[8]

Another pertinent fact is that many candidates, as noted many times by the Academic Board, are utterly unprepared, and should in some way be saved the time sacrificed[9] in their attempting the entrance examinations of the Academy. In April, 1917, for example, 12.8 per cent of the candidates presenting themselves for mental examination failed in all six subjects.

Obviously, therefore, while changes may be made in the examinations, improvements are also highly desirable in methods of selecting the candidates themselves.

Taking up now the selecting of candidates, we find that great changes have taken place. But nearly every change has been intended by the law makers of the country to widen for the common American boy the door to the commissioned grades in the navy.

From March of 1794 to August of 1842, candidates were appointed midshipmen[10] by the President straight from civil life, with no legislative restrictions as to age, education, or fitness. There was not even a limit, after 1809, upon the number the President might appoint.[11] Abuses inevitably developed. After the custom of the British Navy, midshipmen were appointed on the

[8] Ascertained by a personal examination of the candidates' records.

[9] The Academy and Navy Department publish complete and extensive pamphlets on the entrance requirements, most of which are entirely ignored by candidates.

[10] The first seven candidates to enter the Naval School were styled, after admission, "acting midshipmen," and that appellation was kept until July, 1862. From then until July, 1870, the students admitted to the Academy were called "midshipmen." After this date and up to August, 1882, they were styled "cadet midshipmen." There were also authorized at the Academy, from 1864 until 1882, special students of engineering. The first of these entered in 1866, two as "cadet engineers," the rest as "acting third assistant engineers." The latter designation was dropped in 1868. After 1882 "naval cadet" was employed for all candidates admitted into the Academy, and was retained until July, 1902, when the good old grade of "midshipman" was restored.

[11] Park Benjamin—United States Naval Academy (1900), p. 29.

recommendation of captains in the navy and of political friends of the executive. Appointments came to run in grooves. Naval service, naval rank and influence, became almost a heritage of certain families and certain sections. Some political appointees, like Philip Spencer, proved to be outrageously unfit. Some districts secured an undue share of appointments. The charge was made, and not refuted, that of the 158 midshipmen appointed in 1841 no less than 70 had come from Washington, Maryland, and Virginia. As was to be expected, therefore, limitations were soon placed on the power of the executive to appoint candidates as midshipmen. In 1842 the number of midshipmen allowed by law was limited to 262. In 1845 the number of midshipmen allowed from each state and territory was made proportionate to its number of representatives, and it was decreed that the appointee should be an actual resident of the state from which he was appointed. In 1848, when the authorized number of midshipmen was increased to 464, it was required that appointments should be equally apportioned among the several congressional districts. In 1850 the law provided that no midshipman should be appointed from any district that had more than two midshipmen already in the navy.

Soley's history of the Naval Academy explains the origin of the present method of selecting candidates in the following way: "As it was impossible for the Secretary of the Navy to know much about the inhabitants of each congressional district, he naturally came to rely somewhat upon the testimony of the member representing the district in regard to the fitness of an applicant for appointment. From this it was an easy step to the present system, legalized by the act of August 31, 1852, by which no one can be appointed a midshipman except on the recommendation of the member of Congress representing the district in which the applicant resides. The system had already been adopted in making appointments of cadets at West Point." The power of filling vacancies in the Naval Academy is now shared also by the President, the Secretary of the Navy, senators, the Governor General of the Philippine Islands, and the Governor of Porto Rico.[12]

[12] The problem of obtaining the best candidates is affected by the number to be nominated each year for appointment. The greater the number the greater the care that must be exercised to nominate only the fit and worthy. In 1794, as stated by Park Benjamin, the number of midshipmen allowed by law was 48. In 1801 there were 350. In 1809 the number was

raised to 450, and two months later the President was authorized to appoint to the grade of midshipman as many youths as he deemed necessary. In 1842, the number was limited to 262. In 1848 the limit was made 464, and in 1862 the limit was raised again.

In 1862 two midshipmen were authorized for every member and delegate in the House of Representatives, two for the District of Columbia, ten at large, and three annually from boys enlisted in the Navy of at least one year's service, six months of which must have been sea service. These appointments from the service were authorized until 1870, and are of special interest in the light of existing law providing for the admission of 100 enlisted men annually into the Academy.

Another innovation was made in 1864, when the appointment was authorized of 50 cadet engineers who were to take a special two-year course. Under this law two cadet engineers entered in 1866, but failed to graduate. Two more entered in 1867 and graduated with the class of "acting third assistant engineers," who had entered the Academy in 1866. Cadet engineers re-appeared at the Academy in 1871, when a class of 16 was admitted on the first of October. In 1874 the appointment of cadet engineers was augmented to 25 annually. They were appointed each year after competitive examination at the Academy. 177 candidates competed for these appointments in 1879, 167 in 1880, and 155 in 1881. After bringing into the service some of its keenest minds, these competitive examinations and appointments for cadet engineers were abolished in August, 1882.

Appointments at large came into existence again, after a lapse of ten years, on the fourteenth of July, 1862, when the President was authorized to appoint, for education at the Naval Academy, ten acting midshipmen who were to be chosen from the sons of officers or soldiers. In 1867 the appointments of enlisted boys were increased by law to ten annually, and the other appointments at large also increased to ten annually. In 1870 the appointment of enlisted boys was stopped. In 1878 the appointments at large allowed in the Academy were reduced to ten. In 1902 they were increased to 15, and in 1903 were made five each year, an increase of five in the total allowed. In 1913 the number was increased to ten each year, and in 1916 to 15 each year. Fifteen is the number now authorized by law to be appointed at large by the President.

Returning now to the ordinary appointments, we find in 1867 a reduction in the number allowed by law to one midshipman for each member and delegate in the House of Representatives, and one for the District of Columbia. The number at the Academy was still further reduced in March, 1873, when the term of the Academic course was made six years by law. Appointments were filled thereafter every six years instead of every four years. Quadrennial appointments were restored, however, in June, 1900. Senatorial nominations for appointment were instituted in July, 1902. The second great increase granted the Academy, similar to that during the Civil War, was in March, 1903. Two midshipmen were then authorized for each senator, representative, and delegate, and two for

the District of Columbia. This increase was for a term of ten years, but in 1913 was extended to July, 1919.

In February, 1916, the number of midshipmen allowed at the Academy was increased to three for each senator, representative, and delegate. On April 25, 1917, there was a still further increase to four for each senator, representative, and delegate. This last expansion, however, is to affect only the classes entering in 1917 and 1918.

The appointment of enlisted men to the Naval Academy, which had been authorized in 1862 and stopped in 1870, was resumed in 1914. On June 30, 1914, it was provided that "hereafter, in addition to the appointments of midshipmen to the United States Naval Academy as now prescribed by law, the Secretary of the Navy is allowed 15 appointments annually from the enlisted men of the Navy who are citizens of the United States and not more than 20 years of age on the date of entrance to the Naval Academy, and who shall have served not less than one year as enlisted men on the date of entrance; *Provided*, That such appointments shall be made in the order of merit from candidates who have in competition with each other passed the mental examination now or hereafter required by law for entrance to the Naval Academy, and who passed the physical examination required before entrance under existing law." The number 15 was augmented on August 29, 1916, to 25 annually, and on March 4, 1917, to 100 annually.

Alternate appointments or rather nominations are unique to this country. They are extremely valuable to many boys without political influence who, by means of an "alternate," secure admission to the Academy and the expectation of a commission in the navy. Before July, 1862, no alternates were authorized. After this date, one alternate was allowed to each principal, but only in case the principal failed to pass the earlier of the two candidates' examinations of that year. Alternates and candidates appointed late were examined in September until 1902. From 1902 to 1906, inclusive, five alternates were allowed for each principal, and were permitted to take all examinations with the principals. The present number of alternates allowed is three for each principal; and they may take either the February or the April examination.

In 1903 there was authorized one midshipman from Porto Rico, to be a native of the island and to be appointed by the President on the recommendation of the Governor of Porto Rico. Somewhat similarly, on the fifteenth of February, 1916, the law authorized a citizen of Cuba, Mr. Carlos Hevia y Reyes Gavilan, to be received for instruction in the Naval Academy, at his own expense. Still another special group of midshipmen was created on the August 29, 1916, when four Filipinos, one for each class, were authorized to receive instruction at the Naval Academy. They are to be designated, one for each class, by the Governor-General of the Philippine Islands.

If all the appointments allowed by existing law were filled, there would be at the Academy, during the year 1917-1918, 2094 midshipmen, appointed as follows: 384, four for each senator; 1748, four for each of the 437 representatives and delegates in Congress; 18 already in the Academy.

The only limitation of the power to nominate a candidate for examination and appointment is that he must be an actual resident of the state or district from which he is appointed. The law does not prescribe, however, any judicial or other method for proving residence. The statement of the candidate and the recommendation of the member of Congress are never questioned by the Navy Department. And yet the intent of virtually every single change in the law is clear—to make every district sure of its due representation in the Naval Academy of the United States.

It is evident that the selection of candidates for appointment as midshipmen is very largely in the hands of senators, representatives, and delegates. Here, in the selecting of candidates, is the greatest need of change and the greatest opportunity to improve the raw material for officers, or the stuff that naval commanders are made of. The need of change is shown by the large number of wholly unprepared and unfit candidates that come up for the entrance examinations each year. In June, 1917, for example, there were 1417 candidates examined and 221 of them were wholly unprepared and unfit, for they failed in all six subjects. In April, 1917, 723 candidates were examined and 93 of them failed in every subject. In 1916, out of 1859 candidates, 150 failed in all six subjects. A great many more fail each year in four or five subjects. The nomination of wholly unprepared candidates is the main reason why so many districts are not represented in the Academy, and why sometimes a third of the authorized appointments to the Academy are not filled.[12]

The opportunity for improving this condition has already been made plain by the practice of a considerable number of members of the Congress. In recent years more and more of them have come to impose some sort of competitive preliminary test upon

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and 15 entering in 1917, appointed at large by the President; also appointed by the President, one from Porto Rico and two from the District of Columbia; appointed by the Secretary of the Navy from the enlisted force, 21 already in the Academy and 100 to be appointed in 1917. The Secretary is also authorized to permit four Filipinos and one Cuban to receive instruction at the Academy. If existing law is continued in force, there will be at the Academy in four years, that is, during the year 1920-1921, a possible maximum of 2600 midshipmen. According to the usual ratio of filled to authorized appointments, there will probably be in the Academy in 1921 upwards of 2000 midshipmen.

[12] On 22 September, 1917, there were only 1447 midshipmen in the Academy. There were 2294 authorized.

all applicants for appointment as midshipman, and have in this way selected candidates of demonstrated superiority and fitness for the Academy's work. Such preliminary tests are usually based on previous examination papers of the Academy, and are conducted as a rule by local superintendents of schools. The newspapers of the district are uniformly glad to advertise, without charge, such a competition for the ambitious boys of the district or state. By this means expense for applicants and trouble for the members of Congress are both kept at a minimum.

Competitive examinations have sometimes been criticized as likely to bring appointments to the bookish or even the unprincipled, rather than to those who would make the best naval officers. But the member of Congress can restrict his competitions to those of approved character, and may base his award on other factors besides the examination mark. Rhodes scholarships, for example, are awarded on the basis of moral character, scholarship, athletics, and leadership. And civilian instructors at the Naval Academy are selected on the basis of a competition that includes teaching record, personality and bearing, health, and other factors besides mere ability to write a good examination paper. The aim is to select men according to their capability rather than their attainments alone.

The effect of making nominations of midshipmen on a competitive basis, as already practiced, has been very instructive. In June, 1917, there took the Academy's entrance examinations 206 candidates who had been nominated after taking preliminary competitive tests. Of these, 42.71 per cent were accepted by the Academic Board as mentally qualified for admission to the Academy. Compare with this percentage the 26.55 per cent accepted out of the whole number examined in June. Compare, also, the 17.5 per cent of successful candidates who, without any sort of preliminary test, were nominated for competitive examination by the Academy. In 1916, to take another year, out of 419 candidates nominated after competitive examination, 39 per cent were accepted, while of 1437 candidates nominated without competitive examination only 29 per cent passed. In 1915 the percentages were 42 per cent and 36 per cent, and in 1914, 56 per cent and 46 per cent respectively. No conclusions can be drawn from the few competitives of earlier years.

A further advantage of nominating candidates after competitive examination is shown by the records of midshipmen in the Academy. In 1916, out of 128 midshipmen entering after com-

petitive examination only 3.9 per cent failed during the year. Of 475 midshipmen entering otherwise the failures during the year amounted to 16 per cent. In 1915 the percentages of those dropped during the first year after admission were, competitives 12 per cent, non-competitives 19 per cent. In 1914 the percentages were 11 per cent and 13 per cent respectively. Before 1914, the number of candidates nominated after competitive examination was too small to warrant conclusions.

So far, then, as concerns the mental examinations, this review of the requirements for admission to the Naval Academy has shown that the original aim was to test primarily the candidate's capability, his ability to " make good " in the Academy, rather than his acquisitions of facts or rules. Ever since the first, this has been the ideal of the examiners. Following the practice of colleges, the Academy has increased its requirements as fast as our grammar schools and high schools have included more of the requisite subjects in their courses. It has never, however, been as free as the colleges to raise its standards.

Yet, notwithstanding the fact that in comparison with college requirements the entrance examinations of the Naval Academy are by no means difficult, there is often a demand for still lower standards. This has resulted, partly, from changes in the laws governing appointments to the Academy. From the apportioning law of 1845 to the present, the intent of each change in the law has been to make every district and territory of the whole nation, whatever its educational advantages may be, more certain of having its due representation in the Naval Academy and among the naval officers of the United States. The tendency always has been to widen for every American boy the door of opportunity. Reflected in each change there has been an instinctive effort on the part of our lawmakers to attain one of our democratic ideals, that of opening a career for the talents of every man. But neither the intent of equal representation nor the democratic ideal of career open to talent is regarded when unprepared candidates are nominated, and when, as a consequence, vacancies are left in more than a third of our districts. Both intent and ideal, however, could be approximately attained if the method already adopted by many members of the Congress were adopted by all. If every candidate for appointment to the Naval Academy were nominated only after a qualifying, competitive test, candidates would, as we have seen, be more successful, both in meeting the requirements for admission, and in completing the academic course.

NOTICE

The last installment of the article on Arctic Duty has been omitted from this number, but may appear at a later date.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Changes in the officers of the Institute

Lieutenant Commander G. M. Ravenscroft was selected to relieve Lieutenant Commander I. C. Kidd as Secretary and Treasurer.

Dues

The annual dues ($2.50) are now payable. It is suggested that payment be made in lump sums to cover a period of two to five years; this method of payment is practiced by a number of members, both regular and associate, and has advantages for members as well as for the Institute.

In case of death or resignation, dues paid in advance, except for the current year, will be returned to estate or individual.

Address of Members

All members are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS *are to be sent, and thus insure their receipt.*

This precaution is now of particular importance as notices of changes of station are not now available for the use of the Institute's staff.

Non-receipt of Proceedings

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

Membership

Since November 17, 108 regular members and 11 associate members have joined the Institute.

Deaths:

Rear Admiral John Schouler, U. S. Navy, Retired.

Resignations: Three.

Book Announcements

Attention is invited to the List of Publications for a complete catalogue of books revised and republished.

The Landing Force Manual, U. S. Navy, 1917, is being compiled by a board of officers and will be ready for distribution shortly after the compilation has been completed, probably March 15, 1918.

It is announced that the Manual of Wireless Telegraphy has been revised and will appear about February 15, under the title "Robison's Manual of Radio Telegraphy and Telephony."

Seamanship Department Notes, U. S. Naval Academy, is ready for distribution.

Discount on Books.

The five per cent additional discount allowed to purchasers of books whose accounts during a calendar month amounted to a hundred dollars or over has been discontinued.

Book Department

The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers.

Suggestions Invited

Comment and suggestions relative to the make-up of the PROCEEDINGS are invited from all members interested in the welfare of the Institute. It is believed that the scope of usefulness of the PROCEEDINGS to members can be increased and all members are invited to assist in this work. Should any topic, on which you think an article could well be written, occur to you, send it to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood. The Institute is desirous of obtaining good "sea yarns" for publication. It is hoped that any one who can spin such a yarn will submit it.

Reprints of Articles

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

Illustrations

Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Notice

Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., December 22, 1917.

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UNITED STATES NAVAL INSTITUTE
ANNAPOLIS, MD.

REPORT OF AUDIT FOR THE YEAR ENDED DECEMBER 31, 1917

BALTIMORE, MARYLAND, January 7, 1917.

TO THE OFFICERS AND MEMBERS OF THE UNITED STATES NAVAL INSTITUTE, ANNAPOLIS, MARYLAND.

Gentlemen:—We have audited the books of the *United States Naval Institute, Annapolis, Maryland,* for the year ended December 31, 1917, and submit herewith a certificate, one page of comments and the following exhibit and schedules:

Exhibit A.—Balance sheet as of December 31, 1917.
Schedule No. 1.—Statement of cash receipts and disbursements for the year ended December 31, 1917.
Schedule No. 2.—Investments.
Schedule No. 3.—Accounts receivable.
Schedule No. 4.—Certified checks.
Schedule No. 5.—Accounts payable all as of December 31, 1917.
Schedule No. 6.—Statement of income and expenses for the year ended December 31, 1917.

Respectfully,
BLACK AND COMPANY,
Certified Public Accountants,
By WILMER BLACK, C. P. A.
(*Member American Institute of Accountants.*)

UNITED STATES NAVAL INSTITUTE
ANNAPOLIS, MARYLAND

CERTIFICATE

We have audited the books of the *United States Naval Institute, Annapolis, Maryland,* for the year ended *December 31, 1917,* and

We hereby certify that the accompanying *balance sheet* and *statement* of *income* and *expenses* are correct; and, in our opinion subject to the attached comments, clearly set forth the true financial condition as of *December 31, 1917,* and result of operations for the year ended *December 31, 1917,* respectively, as disclosed by the books of account.

BLACK AND COMPANY,
Certified Public Accountants,
By WILMER BLACK, C. P. A.
(*Member American Institute of Accountants.*)

Baltimore, Maryland, January 7, 1918.

UNITED STATES NAVAL INSTITUTE
ANNAPOLIS, MARYLAND

COMMENTS ON THE AUDIT OF THE BOOKS FOR THE YEAR ENDED DECEMBER 31, 1917

By referring to Exhibit A, Schedule No. 6, of this report, you will note how we have arrived at the Cost of Publications sold. In this amount we have included all items that are an actual part of the cost.

Our examination, which was very carefully made, disclosed no discrepancies or inaccuracies; one or two clerical errors were found and adjusted. The records, books, etc., show a painstaking and careful attention to details.

EXHIBIT A

BALANCE SHEET, DECEMBER 31, 1917

ASSETS

Current Assets.		
Cash (in bank), Schedule No. 1	$13,815.57	
Investments, Schedule No. 2	64,000.00	
Accounts receivable, Schedule No. 3	22,071.62	
Inventory, December 31, 1917 (as taken by yourselves)	9,614.26	
Certified checks, Schedule No. 4	10,041.00	
Total current assets		$119,542.45
Balance	$103,351.10	
Furniture and Fixtures	466.10	
		$103,817.20

LIABILITIES

Current Liabilities.		
Accounts payable, Schedule No. 5		$16,191.35
Total current liabilities	$16,191.35	
Balance (excess of current assets over current liabilities)	103,351.10	
		$119,542.45
Reserve Fund.		
Balance, January 1, 1917	$7,563.14	
Cash receipts	300.95	
Transferred from general fund	30.00	
		7,894.09
(This fund by the constitution is composed of $3050 originally credited to it, together with all life fees, which have been, or may hereafter be received, and the principal of this fund shall be held in perpetuity to guarantee the future interest of the life members.)		
Surplus.		
Balance, January 1, 1917	$73,615.82	
Add: Net profit for the year ended December 31, 1917 (for details see Schedule No. 6)	22,307.29	
		95,923.11
		$103,817.20

EXHIBIT A.—SCHEDULE No. 1

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS FOR THE YEAR ENDED DECEMBER 31, 1917

Balance, January 1, 1917		$20,364.54
RECEIPTS		
Dues	$5,622.69	
Subscriptions	2,452.15	
Sale of books purchased	2,554.30	
Advertisements	1,204.96	
Interest on investments	3,062.79	
Postage	1,657.92	
Binding	85.08	
Life membership fee	300.95	
Sale of extra publications	74,261.27	
Sale of Proceedings	206.25	
Certified checks	1,231.00	
Overpaid	327.23	
Stationery	.37	
Expense	.88	
Advertising	12.50	
Total receipts		92,980.34
		$113,344.88
Balance, January 1, 1918		$13,815.57
DISBURSEMENTS		
Printing and binding Proceedings	$13,828.60	
Printing and binding extra publications	45,978.12	
Salaries	5,820.50	
Contributors	3,938.75	
Authors of books (royalties)	1,765.65	
Postage and telegrams	2,166.09	
Expressage, freight and hauling	1,438.60	
Board meetings	416.00	
Purchase of books for sale	2,728.83	
Office expenses—stationery, supplies, etc.	755.75	
Stationery	520.80	
Advertising	284.10	
Prize essay award	200.00	
Certified checks	11,272.00	
Honorable mention award	175.00	
Engraving prize essay, medal and case	23.20	
Overpayments	217.32	
Purchase Liberty Loan bonds	8,000.00	
Total disbursements		$99,529.31
Balance, December 31, 1917		13,815.57
		$113,344.88

Seaman's Bank for Savings, New York City.			
Balance as per letter dated January 5, 1918..			$3,000.00
Rhode Island Hospital Trust Co., Providence, R. I.....			
Balance as per letter dated January 5, 1918..			3,570.78
Society for Savings, Hartford, Conn.....			
Balance as per letter dated January 7, 1918..			3,695.50
Farmers' National Bank, Annapolis, Maryland			3,549.29
Balance as per statement dated January 3, 1918		$14,202.58	
Less Outstanding Checks.			
#2747	$ 2.50		
2982	7.50		
3171	1.80		
3430	2.04		
3498	1.50		
3550	43.00		
3656	.50		
3746	84.00		
3752	8.00		
3782	19.98		
3813	6.23		
3818	10.00		
3822	.60		
3827	112.50		
3829	4.50		
3830	2.25		
3831	4.00		
3833	119.00		
3834	56.00		
3835	99.75		
3836	31.50		
3837	12.00		
3839	10.50		
3840	13.50		
3843	5.00		
3845	5.00		
3846	.60		
3848	1.20		
3849	.30		
3850	9,856.04		
3851	75.00		
3852	35.00		
3853	20.00		
3857	2.00		
		$10,653.29	
		$3,549.29	
			$13,815.57

EXHIBIT A.—SCHEDULE No. 2

SECURITIES (BONDS) DECEMBER 31, 1917

Face Value		Book Value
$6,000	Southern Railway. 6 $1000 5% registered gold bonds, #M257-247-475-476-477-478, due 7/1/1994	$6,000.00
2,000	Washington Railway and Electric Co. 2 $1000 4% 50 year gold bonds, consolidated mortgage, due 12/1/1951, #2183-2184	2,000.00
18,000	Northern Pacific and Great Northern R. R. 8 $1000 joint bonds registered 4%, due 7/1/1921, #M13253-4-11171-13255-11172-11769-11770-11771; 2 $5000 C. B. & Q. collateral registered 4%, due 7/1/1921, #V5199-5401	18,000.00
12,000	Northern Pacific Ry. 4 $1000 3% registered gold bonds, #M1610-1-2-1650; 1 $5000 3% registered gold bond, #1123; 3 $1000 3% gold bonds, #M216543-4-5, general lien, due January 1, 2047	12,000.00
9,000	B. & O. R. R. Company. 1 $5000 1st mtge. 4% 50 year gold registered, due 2/17/1960, #A436; 1 $1000 1st mtge. 4% 50 year gold registered, due 2/17/1960, #M1230; 3 $1000 prior lien 3½%, due 1925, #SM383-4-5. ($7,894.09 of these bonds belong to the Reserve Fund.)	9,000.00
2,000	Potomac Electric Power Co., 5%, due June 1, 1929, #833-4	2,000.00
7,000	New York City, registered 4¼%, due March 1, 1962, #588	7,000.00
5,000	3½% Liberty Loan bonds, registered, due June 15, 1947, #6033-4-5-6-7	5,000.00
3,000	4% Liberty Loan bonds	3,000.00
$64,000		$64,000.00

EXHIBIT A.—SCHEDULE No. 3

ACCOUNTS RECEIVABLE, DECEMBER 31, 1917

Back dues	$1,253.00
Subscriptions	3.00
Advertisements	378.62
Extra publications	20,437.00
	$22,071.62

EXHIBIT A.—SCHEDULE No. 4

CERTIFIED CHECKS, DECEMBER 31, 1917

Aug. 11.	Secretary of the Navy			#3516	$150.00
22.	"	"	"	3529	686.00
Oct. 1.	"	"	"	3618	1,125.00
3.	"	"	"	3636	250.00
22.	"	"	"	3667	3.155.00
31.	"	"	"	3683	2,490.00
Nov. 18.	"	"	"	3734	660.00
28.	"	"	"	3780	1,525.00
					$10,041.00

EXHIBIT A.—SCHEDULE No. 5

ACCOUNTS PAYABLE, DECEMBER 31, 1917

Lord Baltimore Press	$9,815.10
Longmans, Green and Co.	3.46
Harper and Brothers	41.72
D. Van Nostrand Co.	237.99
McGraw, Hill Book Co.	12.75
R. Beresford	1.50
U. S. Infantry Ass'n	30.70
National Geographic Society	1.00
John Wiley and Sons	3.75
Barse and Hopkins	5.32
J. B. Lippincott Co.	8.41
Putnam's Sons	2.69
Dodd, Mead and Co.	1.94
Little, Brown and Co.	3.28
Geo. H. Doran Co.	1.18
Methodist Book Co.	.73
E. P. Dutton and Co.	5.65
Lemcke & Beuchner	4.50
Doubleday, Page and Co.	2.39
N. W. Henley Pub. Co.	.82
R. M. McBride & Co.	2.39
McMillan Co.	6.47
Meyer and Thalheimer	24.20
Steckney and Montague	12.00
James Gantt	6.66
C. and P. Telephone Co.	3.00
Underwood and Underwood	15.00
Phila. Mfgs. Mutual Fire Co.	80.00
Postmaster, Annapolis, Md.	3.91
Lucas Bros.	11.20
Black and Company	100.00
Wells, Fargo and Co. Express	50.47
Sundry authors (royalties)	5,575.97
Sundry credits (overpayments)	115.20
	$16,191.35

EXHIBIT A.—SCHEDULE No. 6

INCOME AND EXPENSES FOR THE YEAR ENDED DECEMBER 31, 1917

Inventory, January 1, 1917.		
Extra publications	$7,012.58	
Extra numbers of Proceedings	300.00	
		$7,312.58
Add: Purchases for year.		
Books for sale	$3,100.18	
Printing and binding proceedings	14,154.26	
Printing and binding extra publications	51,707.44	
		68,961.88
		$76,274.46
Deduct: Inventory, December 31, 1917.		
Extra publications	$9.314.26	
Extra numbers of Proceedings	300.00	
		9,614.26
		$66,660.20

EXHIBIT A.—SCHEDULE No. 6.—Continued

Expressage, freight and hauling	$1,864.55	
Contributors	3,938.75	
Authors of books (royalties)	5,039.72	
Prize essay award	200.00	
Honorable mention award	175.00	
Postage and telegrams	489.84	
Engraving prize essay, medal and case	23.20	
		$11,731.06
Cost of publications sold		$78,391.26
Profit on sale of publications, etc		21,026.89
		$99,418.15

EXPENSES

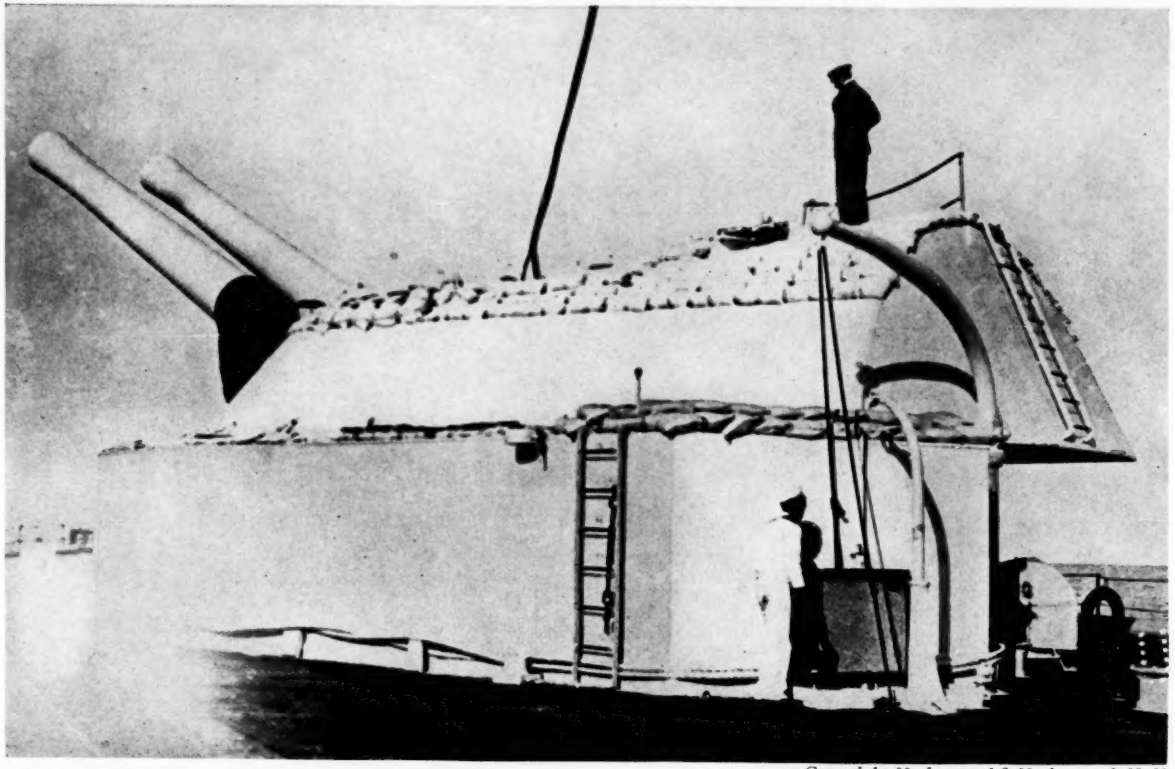
Salaries	$5,820.50	
Office expenses	721.13	
Board meetings	416.00	
Insurance	80.00	
Stationery	543.85	
Advertising	271.60	
Life members	30.00	
Total expenses		$7,883.08
Excess of income over expenses transferred to surplus		22,307.29
		$30.190.37

INCOME

Sale of extra publications		$92,820.35
Sale of books		2,554.30
Sale of proceedings		206.25
Total sale of publications		$95,580.90
Subscriptions		2,390.05
Advertisements		1,362.12
Binding		85.08
Total sale of publications, etc		$99,418.15
Profit on sale of publications, etc		$21,026.89
Dues		6,100.69
Interest on investments		3,062.79
		$30,190.37

This report of audit was accepted and approved by the Board of Control, for publication, January 10, 1918.

I. C. KIDD,
Secretary and Treasurer,
U. S. Naval Institute.



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BRITISH BATTLESHIP READY FOR ACTION IN THE ADRIATIC. SAND BAGS PROTECT TURRETS.

Copyright Underwood & Underwood, N. Y.

British Battleship Ready for Action in the Adriatic. Sand Bags Protect Turrets.

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT W. B. JUPP, U. S. Navy.

GENERAL ARRANGEMENT

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NOTE.—Ship construction in the nations at war is held confidential and no reliable information is available.

ARGENTINA

PROTEST NEW BARRED ZONE.—A number of Argentina newspapers consider that the extension of the German barred zone to include the trade routes between South America and Europe is an unfriendly act toward that country. The papers renew their demands that the government sever relations with Germany.—*N. Y. Times*, 12/1.

GREAT BRITAIN

BIG INLAND HARBOR PLANNED BY BRITAIN.—For a considerable time there have been reports that the British Board of Admiralty had had before it definite plans for a big ship canal to join the firth of Clyde to the west coast of Scotland. These reports are now confirmed. They provide for a canal from the firth of Forth to Loch Lomond and thence out to Loch Long, an offshoot of the firth of Clyde, and so to the open sea. The Mid-Scotland Ship Canal National Association has been informed that the Admiralty is disposed to favor the Loch Lomond route on naval grounds. The association has been working hard for a long time past in favor of a canal by another route altogether.

At present the Loch Lomond route seems to be most in official favor. This route would take the canal from the firth of Forth, as far up as that estuary is navigable for large vessels, by way of low-lying ground to the southern end of Loch Lomond. The northern end of Loch Lomond is only separated from Loch Long by two or three miles of land, and it would be an easy matter to cut through these two or three miles and join the inland loch to the sea loch, and so to the firth of Clyde.

In order to make the waterway capable of carrying large war vessels it would be necessary to raise the level of Loch Lomond by about 22 feet and a number of locks would be required between Loch Lomond and Loch Long, as well as elsewhere on the canal. It would not be by any means a sea-level canal, and therein would lie one of its principal disadvantages.

The "direct route," on the other hand, would be from Grangemouth to a point on the River Clyde a few miles below Glasgow, and by it a canal would be on the sea level. No locks would be necessary anywhere, but there would have to be a "seagate" at either end, so that the rise and fall of the ocean tides would not affect the level of the canal. The Mid-Scotland Ship Canal National Association claims for this route many advantages as compared with the route by way of Loch Lomond. It would follow very largely, if not almost wholly, the line of the present Forth and Clyde barge canal, which in its turn follows the natural valley which joins the firths of Forth and Clyde. It would pass through or near the majority of the most important industrial areas in the Scottish midlands, and its western end would be right in the middle of the great Clyde shipbuilding area, to which war vessels could be taken from the new naval base at Rosyth for overhaul or repair.

Loch Lomond is a large and beautiful stretch of water, and if its level is raised by 22 feet it will provide sufficient depth for the largest of warships. It is likely that the authorities have in their minds the conversion of Loch Lomond into a great inland naval base, from which war vessels could emerge to either coast, as they might think fit. There is something remarkably attractive in the idea of having great squadrons of British battleships, battle cruisers, light cruisers, destroyers and submarines moored in absolute safety away up among the highland hills, far from the dangers of the ocean and also from the dangers of enemy attack, but ready at any moment to slip out either to the Atlantic or the North Sea. There is nothing impracticable in the idea, while there are no insoluble engineering difficulties.—*Washington Star, 27/12.*

SIR JOHN BECOMES PEER AND IS SUCCEEDED BY SECOND SEA LORD.—London, December 26.—Vice Admiral Sir Rosslyn Wemyss has been appointed First Sea Lord, in succession to Admiral Sir John R. Jellicoe, according to an official announcement issued this evening.

Vice Admiral Sir Rosslyn Wemyss was appointed Second Sea Lord of the British fleet last summer. He has a distinct reputation as a fighter of the first order throughout the British Navy. He was born in 1864.

He took a foremost part in the Jutland battle and acquitted himself admirably. He comes of one of the old conservative families of England, being a son of the late J. H. Erskine Wemyss, of Wemyss Castle, Fife. He entered the navy in 1877, was made a lieutenant in 1887, a commander in 1898 and captain in 1901. He was commander of the Royal Naval Barracks in 1911 and 1912, rear admiral of the second battle squadron in 1912 and 1913 and was an extra equerry to the King.

Vice Admiral Wemyss represents the old aristocratic element. As Second Sea Lord he was responsible chiefly for the appointment of the personnel of the navy, and he was undoubtedly taken as first assistant to Admiral Jellicoe because of his knowledge of men and his reputation as a fighter.—*N. Y. Herald, 27/12.*

NEW BRITISH WARSHIPS.—M. Rousseau, the naval expert of the Paris *Temps*, writes that on a visit to the yard of the Fairfield Ship-Building and Engineering Company, Ltd., Goven, he saw, with wonder and amazement, "the extraordinary dimensions of certain new British warships, beside which the size of the *Queen Elizabeth* and *Tiger* would seem very modest." Although complete discretion was observed, he adds that as to actual size one need only to remark that the slips on which these two earlier vessels had been laid down had to be enlarged to realize that the new types were bigger than the old.—*Nautical Gazette*, 3/1.

WHAT BRITISH SHIPS CARRY.—Ninety-one per cent of the tonnage of British ships is now reserved for war munitions, grain and other government supplies. Seven per cent is reserved for cotton, canned goods and other essential shipments. The remaining 2 per cent is unrestricted.—*Marine Journal*, 12/17.

MORE MEN FOR BRITISH NAVY.—A supplementary estimate issued on November 26 provides for the addition of 50,000 officers and men to the navy during the current financial year. The original number voted for 1917-18 was 400,000, so that, with the increase now asked for, the total strength will be raised to 450,000.

At the outbreak of war the establishment stood at 151,000 of all ranks.—*Army and Navy Gazette*, 12/1.

BRITISH NAME NAVAL BOARD.—The new Admiralty Board is announced officially. There is nothing sensational or dramatic about the list of names, and only one naval member of the board was not serving at the Admiralty when Admiral Sir John R. Jellicoe was the head. He is Rear Admiral Sydney R. Fremantle, who becomes deputy chief of staff to Vice Admiral Sir Rosslyn Wemyss, the new First Sea Lord.

Archibald S. Hurd, the naval critic, in commenting on the new board, says it is apparent that no revolutionary disturbance of the main lines of the naval policy is indicated. He adds that behind the new board is the reorganized war staff, for which some of the most brilliant younger officers have been chosen.—*Washington Post*, 13/1.

NEARLY 10,000 LIVES LOST ON BRITISH MERCHANT VESSELS.—It is announced that the number of lives reported as lost on British merchant vessels owing to enemy action from the beginning of the war until June 30 last is 9748.—*Marine Engineering*, January, 1918.

GERMANY

NEW GERMAN CRUISER.—On September 15 a Berlin telegram reported that a large cruiser had been launched at Danzig that day, and named the *Graf von Spee*, after the admiral who commanded the German ships in the action off Coronel, and was lost in the Falklands battle. Prince Henry of Prussia made the baptismal speech, and the widow of the late admiral, Countess von Spee, christened the vessel.—*Journal United Service Institution*, November.

NEW GERMAN SUBMARINES.—Early in September news from Copenhagen stated that Germany was in possession of a number of submarines of a new type, 340 feet in length, with a tonnage of 1500. It was said that they carried 40 torpedoes and a large number of shells and mines.—*Journal United Service Institution*, November.

LARGER GERMAN SUBMARINES.—According to advices received in this country from abroad, the impression prevails among British naval officers that the Germans have designed and constructed and are about to place in action an underwater craft of increased power, capable of vastly extended radius of action and endurance, with the expectation that these vessels will be capable of enlarging their zone of operation to American waters.

It is understood that the new submersibles are considerably larger than the *Deutschland* and can store enough oil to carry them 9000 miles or more, while they also can carry an abundant supply of torpedoes.

Moreover—and this is not their least important feature—the living quarters have been greatly improved. Each member of the crew has almost double the amount of cubic space that could be allotted in the earlier types, the ventilation is superior, and the broad decks enable the men to take exercise. It is doubtful if life on board a destroyer would be any more comfortable than on such a submarine.

That such a big, ocean-going submarine may prove an awkward customer is admitted, but it will not become particularly formidable until in the open sea, and even there the boat will not be as immune as the Germans seem to think. A submersible craft, whether a tiny coastal boat or a 3000 tonner, is subject to the same inherent limitations. If the boat is detected when submerged, the large one is equally at the mercy of the various devices that were devised for the destruction of the small boat, and the large one is under the same disadvantages during the brief interval that must elapse between changing from submersion to surface trim.

German writers lay great stress on the formidable armament of the new U-cruisers, which are reported to carry 6-inch guns, and they assume that with such an armament such a raider may boldly come to the surface and accept an artillery duel with any armed merchant ship or even with a destroyer. However, in the first place, it is doubtful whether 6-inch guns have been mounted on any underwater craft yet built, for there are technical difficulties to be overcome in connection with the mounting of really heavy guns in the submarines, and the best-informed authorities do not accept the German stories on this point.

It might be possible to devise an arrangement to carry a gun of 6-inch bore, but it would have to be a short, low-velocity weapon, which would be inferior in range to the standard 4-inch gun. It is well to remember that the latest 6-inch gun is more than 25 feet in length; also that the gun and its carriage are very heavy.—*Washington Post*, 6/1.

GERMANY'S NEW U-BOATS—A SPANISH DESCRIPTION.—On the supposition that anything throwing light on the construction and equipment of Germany's submarines will prove of interest, we publish a brief description translated from a Spanish weekly. The article makes the astonishing statement that the latest type of U-boat can go around the world without having to replenish its fuel supply—a statement which can hardly be accepted as authoritative. The article follows:

"The latest large German underseas boats are so well equipped that they are able to go around the world without having to replenish the fuel supply for their motors. The motor engines on these new U-boats have been so improved and have developed such a horsepower that they are in every respect equal to the type of engine now installed on fast cruisers.

"Other nations do not possess, so far as known, this novel and intricate class of engines, for they have been unable so far to connect up more than 1000 horsepower double-phase or quadruple-phase motors in 6-cylinder units, and to secure at the same time absolute safety of operation, combined with the maximum speed and power of endurance. The combustion motor

is just as capable of being kept in motion and of having its speed accelerated when under as when above water. The combustion gases are passed over a composition of calcium, whereby they lose their water and carbonic-acid contents. To the passive elements of these combustion gases there is then added so much oxygen as is necessary for perfect combustion. Naturally this oxygen has to be taken aboard in a very compressed form, and for this purpose flasks are used. In this method of propulsion a battery composed of flasks filled with oxygen takes the place of a storage battery.

"It can be easily seen that this system possesses no inconsiderable advantages as regards weight over the method of propelling submarines by electricity.

"However, the most important thing of all is that an almost noiseless motor has been created. Enemy vessels equipped with the most effective underwater sound detectors and such as will give warning of the approach of a vessel driven by ordinary motive power, even while it is a great distance off, and perhaps invisible, will pass by a submarine proceeding under water without being aware of the presence of the undersea boat. On the other hand, a German submarine, even when under water and not making use of its periscope, is promptly notified when a vessel is near at hand.

"Mention should also be made of the fact that thanks to the latest improvements, namely, through the employment of oxygen-flask batteries, the interior of a submarine is made a much more pleasant place of sojourn for those on board. They are no longer obliged to suffer from having to inhale poisonous vapors, combustion gases, and oil exudations, which formerly made life on a submarine almost intolerable, especially in cases of long cruises under water, or of enforced submersions for safety."—*Nautical Gazette*, 27/12.

ADDITIONAL SECRETS OF THE SUPER-ZEPPELINS.—With the dismantling of the Zeppelin *L-49* which was forced to land at Bourbonne-les-Bains and captured practically intact by the French on that eventful day when five or more German air raiders came to grief, further details concerning the construction and equipment are now available.

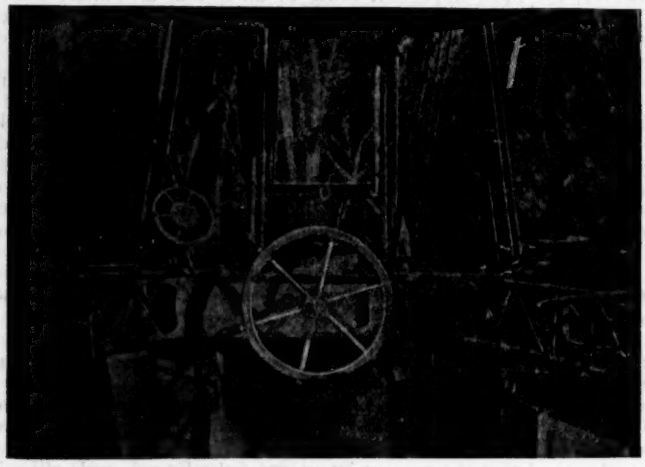
It is understood that the present intention of the French authorities is to exhibit the more interesting parts of the *L-49* at the Invalides in Paris, where so many war relics and trophies have been exhibited since August, 1914. Later the reconstruction of the gigantic German dirigible will be attempted; this task, it is now believed, will require several months of painstaking effort. At any rate, the dismantling operations have brought to light many details which were overlooked in the preliminary inspections of the craft, just after it had landed on a hillside.

The framework of the present super-Zeppelin contains three distinct varieties of aluminum, namely, pure aluminum, aluminum alloyed with zinc, and duralumin. The last-mentioned variety is a well-known alloy of copper, manganese, and about 93 per cent aluminum; and although its weight is about equal to that of pure aluminum, it has three times the tensile strength. The framework of the *L-49* has been estimated at 600 feet in length, 75 feet extreme diameter, and with a capacity of 55,000 cubic meters.

Along the bottom of the huge bag runs a triangular-shaped passageway walled in by a light metal framework, with its apex at the top. The gas bags fold over the triangular framework of this passageway, so that anyone passing through it is virtually surrounded by the gas bags on two sides and the aluminum framework and outer covering, surmounted by the footway, underneath. This gangway or "cat-walk" forms the keel of the big cigar-shaped bag, and serves to connect the various power plants and gun platform of the Zeppelin, with the forward or commander's quarters. The passageway is usually quite dark; but the footway is provided with a hand rail, while at intervals along the framework members small disks of radium

paint serve clearly to mark the way. Indeed, control dials and sign boards in the main passageway and the branch passageways are provided with radium dials and characters, making the use of dangerous lights unnecessary.

Aside from affording a means of communication between various parts of the aerial leviathan, the "cat-walk" serves as sleeping quarters and as storage space. The sleeping quarters are represented by a number of hammocks supported a few inches above the outer fabric cover, to one side of the pine board-walk. Fuel tanks and ballast tanks are suspended from the framework on either side of the board-walk, and it appears that the bombs are also supported in the passageway. The fuel reservoirs are



FRONT END OF THE COMMANDER'S QUARTERS OF THE ZEPPELIN "L-49," SHOWING THE VARIOUS CONTROLS.

aluminum cylinders of 300-liter capacity, and are suspended in groups of two or three. Means are provided for readily releasing these tanks through trap doors in the bottom of the passageway, in the event that every pound of weight which can be spared has to be dropped to lighten the Zeppelin so as to ascend rapidly. Tubes connect the fuel tanks with the engines in the nacelles below, and aside from the main fuel tanks a number of others, not piped to the engines, are kept on hand as an emergency supply.

The ballast reservoirs which replace the former sand bags are made of waterproof cloth and provided with an aluminum spout at the bottom. Each ballast unit has a capacity of 1000 liters of alcoholized water, and it is of interest to note here that the freezing of this liquid ballast prevented the *L-49* from making for the higher altitudes to escape hostile battleplanes, after the gas supply had become seriously depleted through long flight. The ballast reservoirs are suspended from the framework of the "cat-walk" by means of steel cables.

Four nacelles house the engines—two laterally suspended near the center of the airship, and one near each end. The rear nacelle carries two motors, one of which is an emergency unit. In the former description of the *L-49* the statement was made that each nacelle carried two engines which could be employed singly or in tandem in driving the propeller. This statement, it now appears, only applies to the rear nacelle, all the other nacelles being

provided with a single engine and propeller. Each engine is rated at 240 horsepower, making a total of 1200 horsepower for the airship. Each propeller measures 5 meters in diameter. The nacelles, which are more or less egg-shaped, are occupied mostly by the engines, and it is reported that little space is left for the tenders; in truth, the crew in this respect are working under conditions no more enviable than sailors aboard a German U-boat.

The front nacelle is divided into two compartments, the forward or commander's quarters provided with sliding plate-glass windows in front; and the rear or engine room. The commander's quarters appears in one of the accompanying illustrations, and it will be noted that all the controls of the

ONE OF THE "POWER EGGS" OR NACELLES READY FOR TRANSPORTATION.

huge airship are centered here. Among the instruments appearing in the view are a compass and the steering wheel in the center, the bomb-sighting apparatus at the right, with a tank of compressed oxygen just below, and the commander's parachute rolled up at the left. By means of a keyboard the cargo of bombs can be dropped one by one, while a battery of electric lamps shows which bombs have been released. A signal telegraph permits of instant communication with the various engine rooms.

That the present super-Zeppelin is a vast improvement over its predecessors is evident from a study of its lifting power, which is said to be 60 metric tons. This is distributed about as follows: Framework, 30 tons; two middle nacelles, 2 tons; two end nacelles, 4 tons; fuel for 24-hour flight, 7 tons; equipment and accessories, 1 ton; 19 passengers, 1½ tons; bombs, 2 tons, making a total of 47½ tons. This leaves a margin of 12 tons of lifting power, which is ample for all navigating conditions.

The crew comprises 19 men and two officers, who are posted as follows: Two in each of the middle nacelles, three in the rear nacelle which contains two engines, and four in the front nacelle. The remaining members are placed in the passageway or "cat-walk," where they take care of the ballast tanks or snatch a few hours' sleep until called upon to relieve other men. The crew of such a craft, it goes without saying, must be composed of exceptional men—men who can withstand extreme cold, lack of oxygen, and constant nervous strain.—*Scientific American*, 22/12.

U-BOATS UNDER SEPARATE BUREAU.—An imperial decree prescribing for the duration of the war the formation of the new section in the German Imperial Navy Department to be called the U-Boat Department has just been published, according to an Amsterdam dispatch to Reuter's, Limited. The new department deals solely with U-boat affairs, which heretofore have been handled by the dockyards section of the Navy Department.—*N. Y. Herald,* 17/20.

GERMAN MUTINIES.—More trouble in the enemy naval forces is reported. It is a curious thing that discontent in a military nation usually appears first in the navy. The Russian Navy is the latest example of this, the mutinies on the Black Sea warships being the first serious forerunners of successful revolutionary movements. Why this should be true is not clear. But possibly it is due to the fact that a warship is a separate unit: and that, once a crew is organized for trouble, it can pretty well pursue its own course. From the outside, it would seem as if a post on the Kiel fleet would be about as tempting a position as exists to-day in the armed forces of Germany. There is a minimum of danger and a maximum of leisure.—***Montreal Star.***

GERMAN NAVAL GUNNERY.—Russian newspapers recently to hand give interesting details of the naval engagement in the Gulf of Riga, arising out of the German attack on the Oesel, Moon, and Dagoe islands. It appears that the Russian battleships *Slava* and *Grazdanin* (ex-*Tzarevitch*) were engaged by a German dreadnought division, consisting of four ships of the *Kaiser-Koenig* class. The enemy opened fire at a range of 15,000 meters on the Russian ships, and upwards of 200 12-inch projectiles were discharged without scoring a single hit. Observing the ineffectiveness of their fire, the Germans closed the range to 12,000 meters, which was just beyond the range of the antiquated guns mounted in the Russian squadron. Out of a large number of salvos fired at this reduced distance the *Slava* was hit by two 12-inch shells. She sustained no vital injury, but a conflagration was caused, and under the vigorous German cannonade it was impossible to get it under. In the end the commanding officer of the *Slava* ordered the sea-cocks to be opened, and the ship went down with her colors flying, after the entire crew, including the wounded, had been transferred to destroyers. The *Grazdanin* was also hit several times, but was not seriously injured. Towards the close of the action the German ships came within range of the heavier Russian guns, which registered several hits. In this unequal action the German gunnery appears to have been very indifferent.—*The Engineer,* 7/12.

TERRIBLE CONDITIONS IN TOWNS OF GERMANY.—Chancellor von Hertling made his first appearance as a member of the Prussian cabinet in the Prussian upper house on Tuesday to support the housing bill. He said the conditions which had grown up around the large German towns and industrial centers were such as might fill the members of the house with serious anxiety, real pain and occasional sorrow. Not only had the maintenance of repairs to houses been impeded and the increase of housing facilities become almost impossible, but the government desires to provide homes for returning soldiers which will be adequate and healthy.

Dr. Dernburg, speaking on the same bill, said that the conditions in the large towns were terrible and must be abolished. The decline in the number of births had been very great and the mortality of children under 12 months had been still worse.—*Evening Star,* 17/1.

GERMAN DOUBTS U-BOAT SUCCESS.—Captain Persius, the German naval writer of the *Berliner Tageblatt,* takes a rather gloomy view of the submarine situation in his article of November 8. He says General Hindenburg on July 2 predicted that "the war is won for us if we withstand

enemy attacks until the submarine campaign has done its work." The only thing lacking, comments Captain Persius, is the submarine "work." Captain Persius says there seems to be little proof that England is being starved, making the trite remark:

"Just as the German people does not allow itself to be starved straight away, so it is with other peoples," and then he observes: "It may hardly be assumed that a scarcity of food will induce England to sue for peace in the next half year."—*Washington Post*, 23/12.

VON TIRPITZ FULL OF GLOOM.—A gloomy picture of Germany's future was painted by Grand Admiral Von Tirpitz in his recent speech in Essen, according to the *Hamburg News*. Regarding a successful economic war against Germany after the war, he said:

"Imagine the position if we simultaneously have to bear the burden of taxation which must fall on every German and, despite the fallen value of German money, we still have to buy the most necessary food and raw materials from abroad. Can anyone in his heart of hearts really believe that in these circumstances, without an increase of power, without indemnity and without security, we could avoid Germany's ruin?"

Germany's plight at the hands of England he bemoaned as follows:

"Not only has England taken our colonies and Mesopotamia, but everywhere she has made deeper and firmer bases for her maritime and colonial supremacy. She has tarnished and trodden down the prestige and honor of Germany by unprecedented calumnies. In the whole transatlantic world we are considered as conquered and done for."—*Baltimore Sun*, 29/12.

NEW KRUPP PLANT IN SWITZERLAND.—According to a dispatch from Geneva, Switzerland, the Krupps have opened a branch factory at Lucerne with a capital of $7,500,000. Among the directors are Arthur Krupp and Counsellor Ernest Hauer, director of the principal Krupp factory at Essen. The Swiss law demands that when new enterprises are established in Switzerland their objects shall be set forth; and complying with this the company declares its purpose to be the fabrication of arms, cannon and munitions of war; the acquisition of factories, mines and metals, and also their sale. There is evidence that Germany realizes that the concentration of her munition and armor plants in the Essen district, which is only some 40 to 50 miles from the German frontier, is a permanent risk; and during the war, particularly during the latter phases, she has been developing large munition factories at points more remote from danger.—*Scientific American*, 29/12.

PROMISES KIND TREATMENT FOR AMERICAN PRISONERS.—The following statement has been issued by the Wolff bureau, the semi-official news agency in Berlin:

"The report is published from American headquarters that the Germans intend to treat American prisoners systematically worse than British, French and Italian prisoners, and is based allegedly on an official German statement that Americans are hard of understanding and unable to conduct themselves like gentlemen. Such an official statement was never made.

"American prisoners will be treated just as kindly and considerately as all other prisoners."—*Evening Star*, 9/1.

JAPAN

JAPAN'S SINGLE AIM.—While the eyes of the world are at present directed to United States shipping operations in the North Atlantic in rushing supplies and troops from this country to France to help win the world war, a glance at what is going on in the Pacific is enlightening, to

say the least. In 1914, for example, our trade with Japan amounted to $158,000,000 in value. Of this, $81,000,000 worth was carried in Japanese vessels. In the year just closed, our trade with Japan had increased to $338,600,000, while the amount of exports and imports carried in Japanese vessels was $529,000,000. In other words, vessels flying the Japanese flag carried *all of our trade with Japan* in 1917 and $200,000,000 of our trade with other Far Eastern countries.

Anyone who has observed the Japanese policy in regard to her merchant marine since the outbreak of the European war is aware that that government has pursued without a single deviation the policy of creating a great merchant marine which would enable Japan to participate largely in the future control of the world's trade when the war is over. To this end ships to fly the Japanese flag have been built as rapidly as possible, and from the beginning of the war Japanese shipping has side-stepped the war zone. The Japanese steamship lines have not been commandeered by their government as have ours, and when the war is over they will be ready to go right on, while readjustment must be made in the United States from government to private control—another disadvantage for American shipping added to the many it is already laboring under when brought into competition with foreigners under normal conditions.

As a result of Japan's wise shipping policy, the Japanese Steamship Company announced recently that its capital will be more than doubled in the near future, from $22,000,000 to $49,000,000, and that it has plans in hand for building 50 vessels, mostly freighters, aggregating some 400,000 tons. It is the purpose of this company to extend its American and European passenger services, which plan is made possible by a permanent subsidy to be received from the Japanese Government. The increased capital will be in effect in March. Were we making the most of our present opportunity, similar announcements by American steamship lines would be forthcoming.—*Maritime Journal*, 12/1.

PORTUGAL

A MUTINOUS OUTBREAK ON THE PORTUGUESE BATTLESHIP *Vasco de Gama* was checked by artillery fire from a fort in Lisbon harbor after the warship had fired a few shots at the land battery, according to a government announcement, January 9.

The crew in part was landed and disarmed, surrendering to the army and the republican guard, and government forces later gained possession of the battleship.

Measures taken to insure the maintenance of order are declared to have been effective. The statement issued by the government reads:

"The *Vasco de Gama* having left the Santos docks against the government's formal orders and having taken a position in the Middle Tagus before Fort St. George, a battery in the fort opened fire on the cruiser, which replied with a few shots and then hoisted the white flag. Parts of crews of other ships landed some men from the crew who, after being disarmed, surrendered to the republican guard and the army on Commerce Square and at the naval arsenal.

"The government took immediate measures to insure the maintenance of order and the *Vasco* complied. The latter now considers the prevalence of order completely assured.

"The *Vasco de Gama* is already in the government's hands."

A revolution occurred in Portugal early in December, the government capitulating to the rebels after three days' fighting during which 70 persons were reported killed and between 300 and 400 wounded. A new government was formed under Dr. Paez, the revolutionary leader, and President Machado, of the republic, was banished. The movement appears to have been prompted by dissatisfaction with the alleged inefficiency of the old government. There had previously been numerous strikes and riots attributed

largely to food scarcity and high prices, and any monarchist influence in the uprising was denied. The new government pledged itself to continue cordial support of the cause of the Entente Allies.—*Baltimore American*, 10/1.

UNITED STATES

NAVAL VESSEL CONSTRUCTION.—Little has been done at the Navy Department in the matter of preparing new designs for warships of the larger classes, besides the accumulation of information derived from the experiences of the allied fleets that will be valuable when that work is taken up. This is because of the fact that the greater part of the naval construction next year will be confined to building destroyers, minesweepers and other small craft, which can be completed and placed in service in a shorter time and for which there is a continuing demand in the plans for meeting the submarine menace.

It is considered to be more advisable to adhere to this policy and suspend all work on the larger vessels, which will be pushed to completion later on when the rush of work on the smaller craft lessens.

Everything in the way of ship construction is being standardized as far as possible, in order to simplify the work and expedite completion. As rapidly as destroyers are placed in service and fitted out, they are being sent abroad, and in this connection officers that have commanded the older destroyers in foreign waters are returning to this country to take out the latest types.—*Washington Post*, 23/12.

THE DESTROYER BUILDING PROGRAM is making rapid progress. Through an agreement with the Shipping Board priority has been obtained for destroyer construction, the Navy Department in return affording priority for the construction of larger merchant ships, supplying ways and slips and permitting a delay in the building of larger naval vessels authorized by Congress. Parts of destroyers are being built in plants in all parts of the country, shipped to certain destinations when completed and there assembled, thus making possible the more rapid construction of the boats. The navy has not been seriously affected by the labor situation, which is causing distress to some industries. It is said that the navy yards have twice as many workmen employed now as they had a year ago, and that during the last six months they have made shipbuilders out of mechanics who before were not fitted for the construction of ships. Plants for the building of destroyers are being erected at several places, consisting chiefly of additions to existing plants, and it is hoped to have these soon in operation.—*Shipping*, 15/12.

U. S. SUBMARINE FLEET.—Chairman Padgett of the House Naval Committee, says that within a year the United States will have a submarine fleet as good as that of Germany or better.

"The number of submarines now under construction is a naval secret," he said, "and all that can be said is that the 138 which are being built under the authorization of the program of August, 1916, are only a part of the whole number."—*Evening Star*, 18/1.

SUBMARINE CHASERS TO BE COMPLETED BY MARCH.—Although the submarine-chaser program of the Navy Department has been delayed by slow delivery of engines, it was stated to-day, it will be completed by March 1. When the contracts were let it was believed the work could be done by January 1.

The number of boats involved has never been made public. A considerable number are already in service, however, some of them having been turned over to France and most of the remainder are more than 85 per cent completed. No more are to be built as they are regarded as useful only for inshore work.—*N. Y. Herald*, 15/1.

UNITED STATES NAVY.—Surveys of possible aviation, submarine and navy-yard sites south of Cape Hatteras and in the Gulf of Mexico, including Key West, recently were made by the navy-yard commission, of which Rear Admiral James M. Helm is chairman, and a final report of this commission, which also during the past year has investigated suitable locations for naval purposes in practically all sea-coast parts of the country, will be submitted to Congress some time this winter.

In its preliminary report, the board expressed the opinion that immediate steps should be taken to improve the navy yard at Charleston, S. C., so as to permit full utilization of its docking and repair facilities for work of all kinds within the limits of the capacity of the dry dock and the depth of the water that can be maintained, without undue annual expenditure, in the channel approaches from the sea.

Notwithstanding occasional damage from hurricanes, the board indicates the desirability of using the Pensacola yard as an aeroplane station, for which purpose it now is being employed. It is practically closed as an industrial yard for general service of the fleet, but the board recommends its additional limited development as a base for submarines and destroyers.

The board does not favor the development of the station at New Orleans as a first-class naval base, but believes that it has possibilities as a naval station for the repair and maintenance of light-draft vessels operating in the Caribbean Sea and Gulf of Mexico, especially as a base for submarines, destroyers and auxiliary vessels in time of war.—*Washington Post,* 17/12.

NEW RECORD BY DESTROYER.—A new record for sustained endurance has been established by one of the new "flush-deck" destroyers, the Navy Department announced, January 16.

The voyage was from a Pacific to an Atlantic port and occupied 10½ days, the average speed being 19.15 knots. A new record also was set in the construction of the destroyer, only 51 weeks elapsing from the laying of her keel to the date of launching.—*N. Y. Times,* 17/1.

SECRETARY DANIELS ON THE NAVAL FLYING CORPS.—In his report to the House Sub-Committee of the Naval Affairs Committee as well as in the discussion which followed, Secretary of the Navy Daniels gave the following information regarding the expansion of the Naval Air Service:

The increase in the naval aircraft material has been approximately 1400 per cent; in personnel, 3000 per cent; in stations and training schools, 3200 per cent, and better results are steadily obtained. An estimate of 10,000 machines and 5000 aviators is well within the correct number to be expected for next spring.

The naval aircraft factory at Philadelphia which was completed within 90 days, is about 400 feet long and has a floor space of approximately 140,000 square feet. It is expected to produce something like 1000 machines a year of the smaller type, or perhaps one-half that number of the larger type, when in full operation. In addition to relieving other manufacturers for army work, the naval aircraft factory will conduct experimental work. The production end will also supply the navy with correct figures as to the cost of machines and so protect the service as to expenditures.—*Aviation,* January.

U. S. NAVY

PRAISES BUREAU OF NAVY ORDNANCE.—The war activities of the Navy Department, especially the preparations made by the Ordnance Bureau, under Rear Admiral Ralph Earle, are told in detail, so far as is consistent with military policy, in a statement made, January 13, by Representative William B. Oliver, chairman of the special committee investigating the work done by the navy in the war. The statement is based to a great extent on

the testimony given before the committee in executive session by Rear Admiral Earle and Commander Thomas A. Kearney, assistant chief of the bureau.

Representative Oliver prefaced his summary of the accomplishments of the Navy Department with the statement that the committee had been so impressed by the activities of the Ordnance Bureau that it had directed him to make a summary of what had been ascertained in the hearings, most of which were held behind closed doors.

Since the war began the expenditures of the bureau have increased from $3,000,000 a year to more than $560,000,000, and the experts have been called upon to develop new materials and inventions. More than 1100 vessels, the statement says, have been equipped with armor and armament since the fitting out of the *Campana*, on March 14, 1917.

While the Ordnance Bureau of the War Department refused to approve the Lewis gun, the navy's Ordnance Bureau conducted a test of this weapon in April, 1917, and as a result ordered several thousand of these guns. The second detachment of marines which left for Europe was entirely outfitted with the Lewis gun, and "recent reports from the war zone indicate that this gun is giving entire satisfaction."

Representative Oliver's summary of the important activities of the navy follows:

The importance of the readiness and adequacy of the navy's ordnance cannot be over emphasized. Upon this efficiency depends the success of our overseas operations. Guns that will shoot straight, shells that will penetrate the thickest armor, powder that is dependable are the essential requisites of naval supremacy. Ships and men without guns and ammunition are useless.

The bureau, so far as could be learned, has fully satisfied the demands made upon it by the vessels operating in European waters. A letter from Vice Admiral Sims compliments the work and spirit of the Ordnance Department. Other officers in the war zone, writing in similar vein, have given like testimony.

As a preliminary to its hearings, the committee visited the offices of the Bureau of Ordnance and personally examined into the organization and operation of the bureau's administrative details. The committee was most favorably impressed with the business organization, capacity, and capabilities of the bureau to handle expeditiously and efficiently the important war work that comes under its immediate cognizance—the procurement of guns, mounts, shells, powder, fire-control instruments, and the numerous accessories required in the arming of our naval forces.

The organization of the bureau in time of peace had been developed so as to make it an organization for war, with the result that, notwithstanding the enormously increased demands and responsibilities recently placed upon it, that organization is working smoothly and efficiently, notwithstanding the fact that the expenditures have increased from about $3,000,000 to more than $560,000,000. It has gradually been augmented by taking into it retired officers, officers of the naval militia, officers of the coast-guard service, former graduates from Annapolis, and able men from civilian life as needed.

Despite the pressure placed upon the bureau by the demands for more ordnance material of standard type, it has been able to develop much new material, including large depth charges, new submarine bombs, non-ricochet shells, bomb-dropping sights, howitzers, guns for throwing depth charges, smoke-screen apparatus, heavier ordnance on aircraft, and many other important designs which the bureau feels it unwise to disclose, and made much progress on essential articles of lesser importance.

Where there were shortages in the market of various materials, the bureau took steps immediately to develop new sources of supply. It placed contracts rapidly, and the committee is confident that the navy's needs for

ordnance during this war are fully covered by existing contracts and with the capacity now under its control.

Over 1100 vessels have been furnished and equipped with guns, ammunition, spare parts, and all their auxiliaries since the fitting out of the *Campana,* the first ship to be so fitted out, on March 14, 1917.

Reserves of ammunition and shell have been acquired; and money placed at the disposal of the Bureau of Ordnance, the committee finds, has been spent wisely and has been obligated practically as soon as it became available. The testimony convinced the committee that the prevalent belief and opinion as to the navy's readiness was well founded. The Bureau of Ordnance had for years been preparing for war.

Guns, mounts, shell, powder, and ordnance equipment in large quantities had been manufactured and held in readiness for eventual use. With the declaration of armed neutrality, guns and ammunition were promptly placed on the merchant ships of the United States. Upon the declaration of war, telegrams long held in readiness were put on the wire and the wheels were in motion—without a jar the machinery took up the load placed upon it. There has been no breakdown, no let-up. On the contrary there has been increasing speed and greater momentum.

New capacities have been developed for the production of gun forgings and the larger types of broadside gun mounts; firms that prior to the declaration of war had been engaged solely in commercial work have been induced to specialize in ordnance production with most gratifying results. Practically all the contracts made by the Bureau of Ordnance have been on a fixed-price basis as the result of competitive bidding, less than 10 per cent being on a cost plus a fixed-profit basis; cost being as defined by the internal revenue act, and the profit being per pound of gun forgings, or per gun, or per mount.

The navy's industrial ordnance plants have been and are being expanded as rapidly as practicable without interfering with their production. The results of much of this expansion will be felt this spring in the increased deliveries of all types of ordnance material. Without direct control of the gun factory, torpedo station, naval proving ground, powder factory, and ammunition depots, the work accomplished would have been impossible.

It may be pertinent to here state that the bureau has furnished in appreciable quantities the governments of England, France, and Italy with guns from the largest to the smallest caliber, together with proper supplies of ammunition therefor, and is continuing the supply of such munitions to our Allies. In addition to vessels of the regular navy of our Allies, it has armed a considerable number of their merchantmen.

Anticipating the needs of the naval service and Marine Corps for additional machine guns, the bureau wisely conducted a test of the Lewis machine gun early in April, 1917, with a view to definitely determining its serviceability when using the United States small-arms ammunition, and as a result of this test, placed an order for the manufacture of several thousand of the guns. Each company of marines leaving for foreign service has been provided with its proper quota of machine guns, the second detachment being entirely outfitted with the Lewis infantry machine gun, and recent reports from the war zone indicate that this gun is giving entire satisfaction.

Depth charges, which the committee thinks may be properly termed "the terror of the submarine," have been produced in quantity, and are in use by our destroyers and submarine chasers. An adequate reserve of ammunition for all classes of guns has been accumulated, and is held in storage ready for the use of the fleet.

It was specially gratifying to note that the skill, ingenuity, and inventive resources of the bureau have been productive of new designs demanded by the present methods of modern warfare. Advantage has been taken of every suggestion, irrespective of its source. Intimate contact has been established and maintained with the ordnance bureaus and fleets of the

allied nations, the greatest freedom of interchange of information and material being the order of the day. The relationship with army ordnance, Signal Service, Aircraft Production Board, and the Shipping Board has been most intimate and cordial.

The committee was gratified at the executive ability shown by naval officers placed in charge of industrial work. As an illustration, the bureau found it necessary to commandeer a plant producing binoculars and other optical instruments for the navy. Under the former management this plant produced but 168 standard binoculars in two months, whereas during the first two weeks of operation under navy management it has produced 600 satisfactory binoculars for the use of lookouts and for spotters.

The committee made special inquiry as to the damage done to torpedoes at the Bliss works. It ascertained that no torpedoes or damaged parts had found their way into service, that spare parts for torpedoes, such as gyro wheels, had been tampered with, but this was promptly detected by the naval inspector of ordnance and a close watch was maintained upon these articles, with the result that the perpetrator of the damage, one Paul Charles Hennig, a native of Leipzig, Germany, who had been in this country since 1908, has been arrested and is now awaiting trial.

Slight cuts by files had been made in the glass-hardened steel bearings for gyro wheels, and in other cases emery had been placed in bearings and bearing cups. Some fifteen gyro wheels in all were damaged. Exhaustive inspections were made of naval torpedo material, with the result that none of the damaged parts is in any completed torpedoes, either in storage or on board ship.

The committee found that, despite the necessity of placing large emergency orders for material, every effort has been made to insure reasonable prices.

The committee was supplied with full information of how many attacks of submarines upon armed merchantmen had been warded off by the ships' gun crews using the battery with bravery and skill and was given the details of certain engagements of special interest.

The arming of merchantmen and the use of other devices, including sailing in convoys, while doing much to keep down our percentage of losses, are not all that can be desired as a check to the submarine menace. The committee was furnished with the names, tonnage, and armament of all vessels under the American flag engaged in transatlantic trade, together with dates and incidents of all encounters with submarines. The record of attacks on our armed merchantmen shows a comparatively small percentage were successful and that the chances of escape when a submarine is sighted, before she has time to fire a torpedo, are very high, due to the efficiency of the navy personnel.

The unseen torpedo is responsible for 80 per cent of the sinkings.

Admiral Earle referred to the estimates which the secretary had furnished the committee for certain projects that will increase the efficiency of the navy's Bureau of Ordnance, and when these needs are provided the committee had unquestioned faith in its ability, its officers, and personnel to meet the growing demands and responsibilities which the war has imposed upon them.—*N. Y. Times*, 4/1.

NAVAL INCREASE.—Secretary of the Navy Daniels, in testifying before the sub-committee of the Naval Affairs Committee, declares that the navy now has more than 1000 ships in commission as against 300 two years ago, and an enlisted personnel of 280,000 officers and men compared with 64,680 men and 4376 officers when America declared war.—*Literary Digest*, 5/1.

NAVAL EXPANSION.—Some idea of the efficiency of the Navy Department and how it has met the extraordinary demands of the present war crisis can best be gained from the utterances of the Secretary of the Navy in his annual report and before the investigating committee of Congress. From

a force of 4500 officers and 68,000 men enlisted in January, 1917, the navy has expanded to 15,000 officers and 254,000 enlisted men. Further expansions are inevitable. A year ago the navy had 130 stations of all kinds; it has now 363. The number of employees at regular navy yards has increased from about 35,000 to over 60,000. On shore and afloat the naval establishment embraces more than 300,000. At the beginning of the fiscal year 1917 the monthly expenditures for all naval purposes were about $8,000,000 (£1,640,000); they are now about $60,000,000 (£12,300,000). A year ago there were 300 naval vessels of all kinds in commission; to-day there are considerably more than a thousand. These typical figures sufficiently indicate the task the navy has had to accomplish in the way of expansion.

The ability of the navy, without friction or hurrying, to bring to bear its military force rapidly and to increase it threefold in a short time, is credited by the Secretary of the Navy to the system that had been built up in peace times and to the securing before the war of a larger building program extending over a term of years, as well as to the authorization of an increased personnel. Internally the efficient organization, working together for years as a trained team, made the Navy Department's rapid expansion easy, though it taxed the strength and energy of every department head and the entire personnel on shore and in the fleets. It goes without saying that such satisfactory progress in the fighting strength of the navy could not have been accomplished without corresponding efficiency in the business affairs of the department, and it is largely due to the improved business methods and purchasing systems developed that the Navy Department has been able to meet the tremendous and sudden demands of war and embark upon such unprecedented programs of construction and equipment without breaking down the business machinery of the department.

Secretary Daniels' message to the American people that "the navy has met its duties of the present and is preparing for those of the future" will be received with confidence and no interference with the efficient work of this branch of the government will be tolerated.—*Marine Engineering*, January.

RESTORED TO SERVICE 109 BADLY DAMAGED INTERNED SHIPS.—All the damage done to 109 German ships by their crews, prior to their seizure by the United States Government when war was declared, has been repaired and these ships are to-day in service, adding more than 500,000 gross tonnage to the transport and cargo fleets in war service for the United States.

There is evidence that a German central authority gave an order for destruction on these ships, effective on or about February 1, 1917, simultaneous with the date set for unrestricted submarine warfare and that the purpose was to inflict such vital damage to the machinery of all German ships in our ports that none could be operated for from 18 months to two years.

This purpose has been defeated in signal fashion. In less than eight months all the ships were in service.

The destructive campaign of the German crews cunningly comprehended a system of ruin which they believed would necessitate the shipping of new machinery to substitute for that which was ruthlessly battered down or painstakingly damaged by drilling or dismantlement. There is documentary proof that the enemy believed the damage irreparable.

To obtain new machinery would have entailed a prolonged process of design, manufacture, and installation. Urged by the necessity of conserving time the engineers of the Navy Department succeeded, by unique means, in patching and welding the broken parts and replacing all of the standard parts which the Germans detached from their engines and destroyed or threw overboard.

The mechanical evidence is that the campaign of destruction was operated on these ships for more than two months and that the Germans

were convinced that they were making a thorough job of it. Their scheme of ruin was shrewdly devised, deliberately executed, and it ranged from the plugging of steam pipes to the utter demolition of boilers by dry firing.

When the United States Shipping Board experts first surveyed the ruin the belief was expressed that much new machinery would have to be designed, manufactured, and installed, making 18 months a fair minimum estimate of the time required. However, at the Navy Department, where the need of troop and cargo ships was an urgent issue, officers of the Bureau of Steam Engineering, having faith that the major portion of the repairs could be accomplished by patching and welding, declared it was possible to clear the ships for service by Christmas, and the last of the fleet actually took her final sea test and was ordered into service as a Thanksgiving gift to the nation.

To accomplish this end the Navy Department secured the services of all available machinery welders and patchers, many of them having been voluntarily offered by the railroads.

Although explosives were not used in the process of destruction, the engineers of the Navy Department were always conscious of the danger of hidden charges of high explosives which might become operative and disastrous when the machinery was put to a test. Instances of artful pipe plugging, of concealing steel nuts and bolts in delicate cylinders, of depositing ground glass in oil pipes and bearings, of cunningly changing indicators, of filling fire extinguishers with gasoline and similar means of spoliation, were common enough to induce the engineers to make a rule calling for thorough overhauling. On each ship there was no boiler that was not threaded through every pipe for evidence of plugging, no mechanism of any sort that was not completely dismantled, inspected, and reassembled before it was finally passed as safe.

A memorandum written in German was picked up on one of the ships which gave a complete record of the destruction on that ship. Investigation revealed that the list, which had evidently been left through an oversight, was correct in every detail. The following is a translation of excerpts from this memorandum:

"Starboard and port high-pressure cylinder with valve chest: Upper exhaust outlet flange broken off (cannot be repaired)."

"Starboard and port second intermediate pressure valve chest: Steam inlet flange broken off (cannot be repaired)."

"First intermediate pressure starboard: Exhaust pipe of exhaust line to second intermediate pressure flange broken off (cannot be repaired)."

"Starboard and port low pressure exhaust pipe damaged (cannot be repaired)."

The parenthetical optimism of the German who was so confident of the thoroughness of his mutilation is now the source of much glee among naval engineers, inasmuch as every one of the supposedly irreparable parts was in fact speedily repaired and those engines are to-day as powerful and serviceable as when they left the hands of their makers.

The method of patching and welding broken marine engines had never before been practiced, although the art has been known in the railroad industry for 15 years. Three methods of patching were used; electric welding, oxy-acetylene welding, and ordinary mechanical patching, the latter often later being welded. Following the repairs tests of the machinery were first made at the docks, where the ships were lashed firmly to the piers while the propellers were driven at low speed and later each ship was taken to sea for vigorous trial tests. The patches and welds were reported as having given complete satisfaction.

When the *Leviathan*, formerly the *Vaterland* and the largest ship afloat, was put into commission by the United States Government and sent to sea for a trial run, her commander, a young American naval officer, was ordered to "exert every pound of pressure that she possesses, for if there is any fault we want to know it now." The *Leviathan* stood the test. She was one of the ships least mutilated, due to the fact that she was in bad

repair and it was believed that she would not be fit to put to sea for many months. The navy engineers found it necessary to overhaul and partially redesign and reconstruct many important parts of the engines.

The larger German ships which have been repaired and are to-day in commission as a part of the United States Navy, with their former German and their new American names, are as follows:

German Name	American Name
Vaterland	U. S. S. Leviathan.
Amerika	U. S. S. America.
Andromeda	U. S. S. Bath.
Barbarossa	U. S. S. Mercury.
Breslau	U. S. S. Bridgeport.
Cincinnati	U. S. S. Covington.
Frieda Leonhart	U. S. S. Astoria.
Frederic der Grosse	U. S. S. Huron.
Geier	U. S. S. Schurz.
George Washington	U. S. S. George Washington.
Grosser Kurfurst	U. S. S. Aeolus.
Grunewald	U. S. S. Gen. George W. Goethals.
Hamburg	U. S. S. Powhatan.
Hermes	U. S. S. Hermes.
Hohenfelde	U. S. S. Long Beach.
Keil	U. S. S. Camden.
Kaiser Wilhelm II	U. S. S. Agamemnon.
Koenig Wilhelm II	U. S. S. Madawaska.
Kronprinz Wilhelm	U. S. S. von Steuben.
Kronprinzessin Cecilie	U. S. S. Mount Vernon.
Leibenfels	U. S. S. Houston.
Locksun	U. S. S. Gulfport.
Neckar	U. S. S. Antigone.
Nicaria	U. S. S. Pensacola.
Odenwald	U. S. S. Newport News.
Praesident	U. S. S. Kittery.
Praesident Grant	U. S. S. President Grant.
Praesident Lincoln	U. S. S. President Lincoln.
Prinzess Irene	U. S. S. Pocahontas.
Prinz Eitel Friedrich	U. S. S. Dekalb.
Rhein	U. S. S. Susquehanna.
Rudolph Blumberg	U. S. S. Beaufort.
Saxonia	U. S. S. Savannah.
Staatssekraetar Solf	U. S. S. Samoa.
Vogensen	U. S. S. Quincy.

The ships taken over and repaired by the Shipping Board, with their German and American names, are as follows:

German Name	American Name
Allemannia	Owasco.
O. J. D. Ahlers	Monticello.
Adamsturm	Actæon.
Arnallas Vinnon	Chillicothe.
Atlas	(No name.)
Armenia	(No name.)
Arcadia	(No name.)
Andalusia	(No name.)
Adelheid	(No name.)
Bulgaria	(No name.)
Borneo	Nipsic.
Bohemia	Artemis.
Bochum	Montpelier.
Bavaria	(No name.)
Calabaria	(No name.)

German Name	American Name
Carl Diederichsen	Raritan.
Clara Jebsen	Tioga.
Clara Mennig	Yodkin.
Cobelenz	Sachem.
Constantia	(No name.)
Dobek	Monongahela.
Darvel	Wamsutta.
Elmshorn	Casco.
Elsass	Appelas.
Esslingen	Nyanza.
Farn Gerraux	Farn Gerraux.
Gouverneur Jaeschke	Watoga.
Holsatia	Tippecanoe.
Harburg	Pawnee.
Indra	Tonawanda.
Johanne	Iosco.
Koln	Anphion.
Kurt	Mochulu.
Loongmoon	Coosa.
Lyeemoon	Quantico.
Mark	Suwanne.
Mia	Oconee.
Magdeburg	Neuse.
Mattador	Montauk.
Marudu	Yazoo.
Nassovia	Isonomia.
Neptun	Minnow.
Ottawa	Muscoota.
Olivant	(No name.)
Ockenfels	Pequot.
Prinz Eitel Friedrich (Hamburg-American Line)	Ostewgo.
Prinzess Alice	Matoika.
Pennsylvania	Manasemond.
Pisa	Ascutney.
Pongtong	Quinnebaug.
Portonia	Yucca.
Prinz Joachim	Moccasin.
Prinz Oskar	Orion.
Prinz Sigismund	General Gorgas.
Prinz Waldemar	Wacouta.
Pommern	Rappahannock.
Rajah	Rajah.
Rheatia	Black Hawk.
Sachsen	Chattahoochee.
Sachsenwald	General Ernst.
Sambia	Tunica.
Savoia	General Hodges.
Serrapis	Osage.
Setos	Itasca.
Staatssekretar Kraetke	Tacony.
Steinbek	Arapahoe.
Suevia	Wachusett.
Camilla Rickmers	Ticonderoga.
Tsin Tau	Yuma.
Jubingen	Seneca.
Wasgenwald	Wasgenwald.
Wiegand	Midget.
Willehad	Wyandotte.
Wittekind	Iroquois.

Every one of these ships was found to be either deliberately damaged or rendered useless through the ravages of neglect before they fell into the hands of the United States Government.

The most serious typical damage was done by breaking cylinders, valve chests, circulating pumps, steam and exhaust nozzles on main engines, and by dry firing boilers and thus melting the tubes and distorting the furnaces, in at least one instance probably using thermit to make the destruction complete.

There were many instances of minor and easily detectable destruction, such as cutting piston and connecting rods and stays with hack saws, smashing engine-room telegraph systems, and the removal and destruction of parts which the Germans evidently believed could not be replaced. The most insidious sabotage was that which was concealed. In plugging a steam-pipe the method was to disjoint the pipe and insert a solid piece of brass which would be sawed off flush with the joint. The pipe would then be reconnected, showing no evidence of having been tampered with.

Indicators were astutely reversed in many instances. Numerous fire extinguishers were found to be filled with kerosene and gasoline. Piles of shavings and refuse were strewn about where fires might be started, open cans of kerosene being found in several of these incendiary traps. There had evidently been a plan to burn the ships under certain conditions and it is believed that the German crews were seized and interned somewhat in advance of their expectations.

The case of the *Vaterland* was quite different from that of any other ship. Engineers of the Navy Department who examined the big liner declared that inferior engineering had been practiced in her construction. She has four turbine engines ahead and four astern on four shafts. All of the head engines were found in good condition and all of the astern engines were found damaged.

The major portion of the damage was credited more to faulty operation than to malicious intent. Cracks were found in the casing of the starboard high-pressure backing turbine of such size as to make it certain that the engine had not been used on the vessel's last run. Certain documentary evidence found on the ship corroborated this belief. It also indicated that the *Vaterland* on her last trip had made less than 20 knots.

There was just enough evidence of mutilation to warrant full investigation, and the vast mass of machinery, electric apparatus, and piping in the *Vaterland* was patiently and doggedly examined before she was sent to sea. Original defects in her engine equipment were corrected, she was overhauled and in many respects refitted, and on the whole she was declared a better ship when she entered the service of the United States than when she took her maiden voyage.—*Official Bulletin*, 31/12.

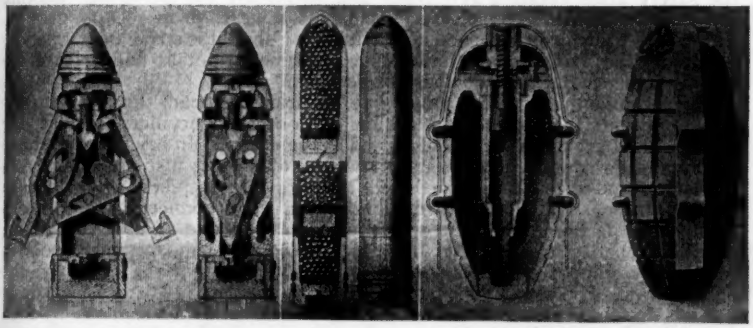
ORDNANCE AND GUNNERY

INVENTIONS WHICH MEET THE NEEDS OF MODERN WARFARE.—Because of the extensive employment of machinery in the world war, the inventor has the opportunity as never before to serve his country in his own favorite way. For the struggle in which we are now engaged has long been recognized as a contest between the great minds of the Central Powers and the Allied Powers—between inventors of both camps.

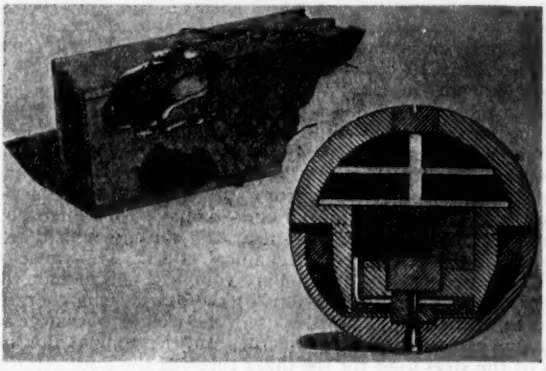
Typical of the inventions which the war has developed are those shown in the illustrations herewith. The first example is a shell for cutting barbed-wire entanglements, which is designed to travel through the air with the ease of the ordinary shrapnel or high-explosive shell until it reaches the target. Most wire-cutting shells have never proved practical for the reason that their wire-cutting members are actuated when the shell leaves the cannon, with the result that the added wind resistance of these members greatly limits the range and interferes materially with the accuracy of the projectile. In the present case the two hook-shaped wire-

cutting members are hinged as shown, and normally fit into slots in the shell case, where they are held by a soft metal band. The time fuse in the nose of the shell is set for any given distance, and serves to detonate a small charge just back of it. The explosive charge, in turn, pushes down a cone-shaped plunger which spreads out the wire-cutting arms. The cutting members are held in place by other members as indicated.

In order to make shrapnel more effective, especially when used against hostile aircraft, Edward Dartford Holmes of Huddersfield, England, has



THESE MILITARY INVENTIONS, IN THE ORDER SHOWN, ARE A WIRE-CUTTING SHELL, A MULTIPLE-CHARGE SHRAPNEL SHELL, AND A HAND GRENADE WHICH IS MADE "ALIVE" BY THE REVOLVING OF ITS SAFETY ARMS.



BY PASSING THIS SPHERICAL GRENADE THROUGH A CONTACT-MAKING TUBE, IT IS MADE READY FOR USE.

invented the multiple-charge shrapnel shell shown in the second illustration. Briefly, his scheme calls for a shrapnel shell containing a number of compartments which are each exploded in turn at predetermined intervals. And in order that the gunners may follow the progress of the explosion, each chamber is filled with a charge which will emit a different colored smoke. Two types are shown, one with the time fuse in the base, arranged to explode base-charge first and nose-charge last, and the other where the fuse is in the nose and connects with the separate charges by means of a long tube filled with a priming composition.

Numerous schemes have been suggested for making hand grenades safe for everyone except the enemy. A typical case is presented in the third illustration, which shows a hand grenade equipped with the usual safety pin and, in addition, safety arms. When the grenadier is ready to use the grenade, he removes the safety pin at the top. However, in this particular hand grenade the firing pin is screwed into the member which holds the safety arms in place, and it cannot disengage itself except by the rotation of the arms. In practice it appears that when the grenade is hurled, the safety arms rotate a few times and so release the firing pin, making the missile "alive." The safety arms, of course, drop to the ground. Should the grenade be dropped accidentally, or should it strike near friendly positions, the arms do not have sufficient time to rotate and release the firing pin, hence the grenade does not detonate.

For a similar purpose but employing electricity instead, the last illustration represents the scheme of Maurice Velin of Rambervillers, France, for making hand grenades safe until hurled at the enemy. In brief, the grenade in this case is round and consists of two metallic parts insulated one from the other and electrically connected by a fusible member, embedded in black powder. The black powder charge, in turn, connects with the explosive charge by a time fuse which may be regulated to suit conditions. As the grenades are required they are passed through a square wooden tube every side of which carries a contact spring that projects into the passageway. The contacts being connected to opposite poles of a battery, it follows that no matter how the spherical grenade passes through the wooden tube the circuit between any two contacts is closed and current passes through the fuse.—*Scientific American*, 22/12.

WEAR IN BIG GUNS.—In the current number of *Arms and Explosives* Major T. G. Tulloch (late R. A.) gives an article of much interest at the present time dealing with the wear of large guns. As the author points out, the wear of such guns has a most important influence on the cost of the war, not only on account of the expense of effecting repairs but because such wear leads to inaccuracy of fire and so increases the amount of ammunition expended to attain a definite objective. On this point he says, "In short, if a few thousandths of an inch of steel at the commencement of the rifling of guns, etc., could be prevented from wearing away in so short a time as at present, the reduction in the cost of the war, so far as guns, ammunition, transport, etc., are concerned, is almost incalculable." In dealing with this matter, Major Tulloch differentiates between the damage to the bore near the breech end—damage for which he retains the usual term "corrosion"—and that near the muzzle which he prefers to call "erosion" as it is a purely mechanical effect. The causes which produce the first-named class of damage are complex, and include the effects of temperature, the form and dimensions of the powder chamber, the chemical and physical qualities of the powder used, the weight of charge and rapidity of fire, the gas escape past the projectile, and the composition and physical properties of the steel used for the inner tubes of the gun. All these matters present many points of interest and they are discussed clearly in the article with which we are dealing. Major Tulloch attaches much importance to the evolution of methods for securing the effective sealing of the gas escape immediately after the firing of the charge, and he makes some suggestions as to the lines on which such a device may be designed. As regards the physical properties of the steel used for the inner tube, Major Tulloch considers that the heat treatment should be subject to the analysis of the steel and the forging effect, and he urges the necessity of obtaining more effective forging of the portion of the tube forming the bore, and suggests certain methods of securing this result. With regard to the erosion near the muzzle due to frictional wear and metallic fouling, it is pointed out that to secure good shooting it is desirable to prevent such fouling by all practicable means, such as slightly bell-mouthing the bore, and, as indicative

of the importance of this matter, he states that by electrolytic methods over 15 pounds' weight of copper have been removed from the bore of an 8-inch gun after firing just over 100 rounds. In concluding his most interesting article, Major Tulloch remarks that it was written to invite discussion and to call attention to certain matters requiring systematic investigation, and we much hope that it may have this result.—*Engineering.*

THE NEW MACHINE-GUN CARRIAGE OF OUR MARINES.—Among the latest equipment of the United States Marines is a new type of machine-gun carriage which strongly suggests the little dog-drawn carts and machine guns used by the Belgians in the early days of the war, with such telling effect. But in the present instance the carriage is drawn by two men, and in this respect it more closely resembles the machine-gun carriages of the Russian troops.

MOUNTED ON A TWO-WHEELED CARRIAGE, THIS LEWIS MACHINE-GUN UNIT OF THE U. S. MARINES IS HIGHLY MOBILE.

Rapidity of motion is obviously the leading feature of the new carriage, for it is provided with two ball-bearing and rubber-tired wheels. A shaft, provided with a double handle, permits two men to pull the carriage, which mounts a Lewis machine gun. The ammunition drums are carried in square steel boxes, just below the gun. In order that the gun may be used to the best advantage, its mounting is such as to provide the utmost freedom of movement. In lightness and mobility this device speaks for itself.—*Scientific American,* 15/12.

A NEW FRENCH GUN.—In order to combat the German machine guns the French of late have introduced a new quick-firing cannon of such construction that it can be readily carried forward by attacking infantry, says the *United Service Gazette.* Thus the skirmishers are able to put enemy machine guns out of action by well-directed shots from their 37-millimeter cannon, which they can carry along with them. The French "37" is a befitting companion to the famous "75," which has figured so prominently in the French campaigns to date. The smaller weapon has every feature of its larger brother, including quick-firing breech mechanism, accurate sights and automatic recoil. Lying out on open ground, two men can fire up to 35 high-explosive shells per minute. The shells measure about 1½ inches in

diameter, and the gun has a range well above a mile for accurate shooting. This odd little field piece can be readily taken apart and carried by six or eight men, and is available for use in advanced positions as well as in the open. It is a most workmanlike piece of armament for use under the conditions prevailing on the western front.—*Scientific American*, 29/12.

A TRANSFORMER WHICH HEATS SHELL BANDS.—In most of the British shell-making plants an ingenious type of transformer is being employed for heating the copper shell-bands. Briefly, the transformer consists of a closed core of laminated iron, one leg of which is hinged and counterweighted so that it can be readily lifted to permit the copper band to be inserted over the primary winding. The copper band when once in position forms the secondary of the transformer, and because of the conversion of a small flow of standard lighting current into low tension but high amperage current in its single turn of winding, the copper band is heated in short order to the desired degree.—*Scientific American*, 29/12.

THE SUBMARINE DEPTH BOMB.—Its (the depth bomb's) destructiveness is based upon the fundamental fact that water is incompressible, and that the shock of detonating a mass of high explosive under water is felt immediately in all directions—the effect diminishing, of course, with the distance from the bomb. It will be remembered that in one of our earlier chapters on the submarine it was stated by Hudson Maxim that 4 cubic feet of trinitrotoluol at the moment of detonation produces 40,000 cubic feet of gas. Now, when a mine or bomb or torpedo war head is detonated the expanding gases seek the line of least resistance. In the case of a torpedoed ship this line leads into the hollow interior of the ship, the incompressible water forming an abutment in all directions; but when a mine or depth bomb is detonated the line of least resistance is upward, and the gases cut their way quickly to the surface, carrying a formidable mass of water to a great height into the air. If the explosion takes place at a considerable depth, however, the resistance to the upper escape of the gases is greater, and the shock transmitted through the water in all directions is proportionately increased. Failing to blow up the surface of the ocean, the bomb must blow up the submarine.

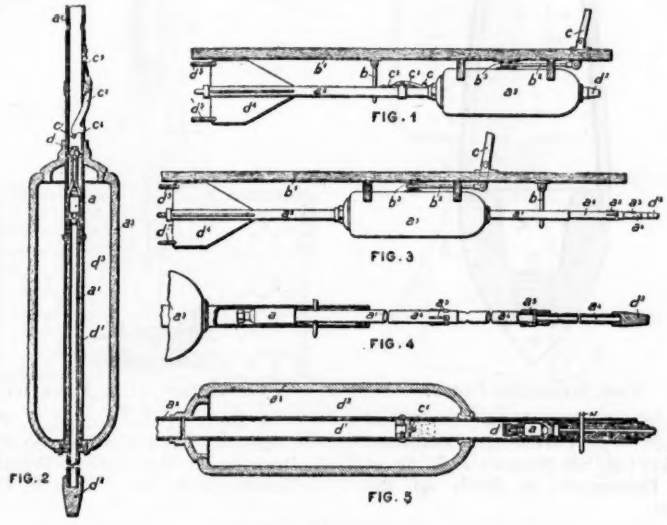
The destructiveness of the bomb against the submarine will depend upon two things: first, the depth at which it is detonated, and, secondly, the distance from the bomb to the submarine. Manifestly, then, it is advisable to detonate the bomb below the submarine, as the shock transmitted will be proportionately greater than if it were above it, other things being equal. As to the distance at which an explosion would be absolutely destructive, rupturing the plating and sinking the submarine, Mr. Hudson Maxim writes us that if 500 pounds of trinitrotoluol were exploded deep under water within 125 feet of a deeply submerged submarine it would completely destroy it. Smaller charges would, of course, have to be detonated proportionately closer to the submarine to secure destructive action.—*Marine Journal*, 17/12.

AIRCRAFT BOMBS.—The missiles which were dropped from aircraft in the early part of the great war were, for the greater part, bombs and grenades of obsolete types which had been formerly employed in field warfare. Their action was rather uncertain and their manipulation was often fraught with considerable danger.

A short time before the war broke out, the Vickers Works of England had, however, patented two types of aircraft bombs which were provided with a safety device that prevented their premature or accidental explosion. The destructive effect of these bombs also greatly exceeded that obtained with old-type missiles.

In the first type Vickers bomb the firing charge is held remote from the explosive charge until after the launching, and means are provided to cause

the bomb to explode at a previously determined distance from the ground or the target. For the latter purpose, the bomb is fitted with a "pilot," consisting of a metallic mass, which is suspended from the body of the bomb by a chain or a wire; the tension of this pilot cord is increased by a parachute, which slows down the bomb's vertical speed. The pilot cord is wound around a drum, which is connected with an aerial propeller, the latter being set in motion through the tension of the cord. When the cord is entirely unwound the spring of the percussion needle is, therefore, held in place only by the weight of the pilot, so that as soon as the latter strikes its objective the spring is released and drives the needle into the percussion cap of the firing charge, which in its turn acts on the explosive charge. The height at which the bomb is made to explode over a target is, consequently, determined by the length of the pilot cord, and can thus be adjusted at will.



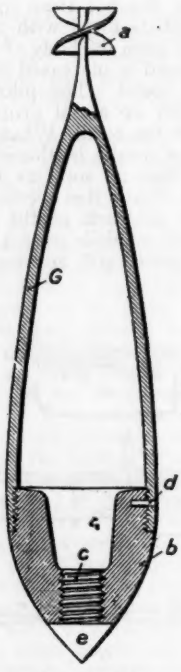
VICKERS PILOT BOMBS.

FIG. 1.—The Bomb Suspended from the Airplane Body. FIG. 2.—Longitudinal Cross Section of the Body of the Bomb. FIG. 3.—Side Elevation of a Collapsible Model of Pilot Bomb. FIG. 4.—Longitudinal Cross Section of a Collapsible Pilot. FIG. 5.—Longitudinal Cross Section of the Body of the Bomb, with Collapsible Elements Compressed.

FIGS. 1, 2.—a, Firing Charge; a_1, Pilot; a_2, Tail Piece; a_3, Shell of the Bomb; b, Locking Spindle; b_1, Airplane Body; b_2, Sliding Rod; b_3, Eye; c, Release Lever; c_1, Firing Pin; c_2, Spring Loaded Hammer; c_3, Spring; c_4, Stop; d_1, Tubular Firing-Pin Guide; d_2, Point of Pilot Rod; d, Percussion Cap; d_3, Explosive Charge; d_4, Stabilizing Fins; d_5, Parachute Cords.

FIGS. 3, 4, 5.—a_1, Pilot Rod; a_4, Longitudinal Cross Section of Collapsible Rod; a_5, Spring Loaded Claws; b, Spindle; c_1, Firing Pin; a_3, Shell of the Bomb; a, Firing Charge; d_2, Forward End of Tube a_1,; d_3 Explosive Charge.

In another type the mass of the pilot is composed of a cartridge with its percussion fuse and cap, and a fuse takes the place of the cord. On striking the target the cartridge sets fire to the fuse, and this, in its turn, sets fire



THE KUNKLER BOMB.

a, Revolving Vane; *b*, Head Piece; *c*, Threaded Detonator Socket; *d*, Set Screw; *e*, Body of the Detonator; *g*, Body of the Bomb.

PILOT BOMB WITH PARACHUTE.

A, Body of the Bomb; *B*, Parachute; *C*, Pilot Cord or Rod; *D*, Position of the Spring Which Is Tensioned by the Pilot; *P*, Pilot.

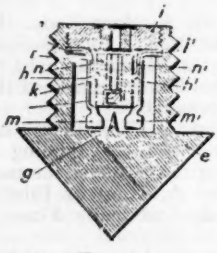


FIG. 1.

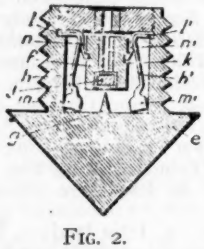


FIG. 2.

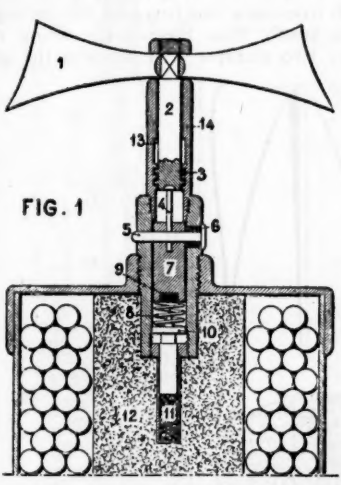
THE KUNKLER DETONATOR.

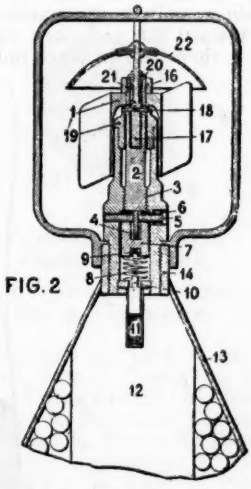
FIG. 1.—Before the Release. FIG. 2.—After the Release.

e, Head; *f*, Cap Holder; *g*, Firing Pin; hh_1, Springs; *i*, Plug; *j*, Percussion Cap; *k*, Groove; mm_1, Outer Springs; nn_1, Inner Springs, Clamping Cap Holder after the Outer Springs are Unlocked.

to the detonating charge. The latter object can also be attained by passing an electric current through the pilot, the current being furnished by accumulators housed in the bomb. The pilot cord is formed of two conducting wires, the mass of the pilot closing the current on contact with the ground. The charge is set on fire either by a spark or by an electro-magnet actuating the percussion needle.

In another type of bomb, also manufactured by Vickers, the pilot consists of a rod, which is carried through the body of the bomb in the longitudinal axis; a tail piece carries in the rear the firing charge and stabilizing fins.





TWO MODELS OF THE MACHENBACH BOMB.

FIG. 1.—*1*, Revolving Vane; *2-3*, Threaded Shaft; *4*, Extension Rod; *5*, Safety Gudgeon; *6*, Spiral Spring; *7*, Percussion Hammer; *8*, Percussion Spring; *9*, Percussion Cap; *10*, Percussion Needle; *11*, Firing Charge; *12*, Explosive Charge; *13-14*, Sleeve.

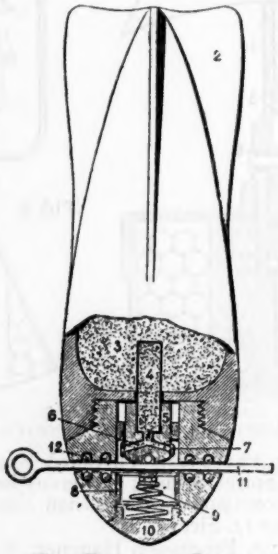
FIG. 2.—*13-14*, Sleeve; *7*, Percussion Hammer; *8*, Safety Spring; *9*, Percussion Cap; *10*, Percussion Pin; *11*, Firing Charge; *1*, Revolving Vane; *2*, Revolving Shaft; *4*, Pin; *5*, Safety Gudgeon; *6*, Spring; *16*, Lock Nut; *17*, Mobile Shaft; *19*, Guide Screw; *20*, Screw; *21*, Spring; *22*, Cap.

The rod rests on a suitable guide, which is locked when the bomb is inactive, but through which it is permitted to slide when the lock is removed. The firing charge is thus kept far apart from the explosive charge, so that even an accidental discharge of the firing charge is not likely to endanger the lives of the crew.

The bomb is suspended underneath the airplane in a horizontal position. By operating the lever which releases the bomb the safety lock is automatically removed and, as the bomb gradually assumes a vertical position, the pilot rod slides forward, and carries the firing charge into the center of the explosive charge. A spring-loaded percussion needle then slides into a suitable aperture provided for in the tail piece of the bomb and is ready for action. When the pilot rod hits the ground the impact makes it slide back in its guide; the firing charge is thus brought in contact with the needle and the explosion follows. To insure the free fall of the pilot rod when the bomb is released, the progress of the bomb is retarded by a parachute, while its course is steadied by stabilizing fins provided on the

tail piece. In some models the pilot rod is composed of a number of telescoping tubes, which develop their whole length under the gravitational speed. The telescoping elements are held in place, after they have reached their full development, by suitable block-devices.

In the Kunkler bomb the safety device is based on the action of the centrifugal forces developed during the fall of the bomb. For this purpose the bomb is provided, at the rear, with an aerial propeller which imparts to the bomb a rotary motion. The firing charge is lodged in the head of the bomb in a detonator, where it is held apart from the needle by means of two spring-loaded masses. As soon as the centrifugal force acquires a certain magnitude the masses will overcome the force of the springs and move toward the periphery of the bomb, thus freeing the firing charge which is then held in place only by two clamps. On striking the ground



THE PUTSCHER BOMB.

1, Body of the Bomb; *2*, Stabilizing Fin; *3*, Explosive Charge; *4*, Firing Charge; *5*, Percussion Hammer; *6*, Fuse Channels; *7*, Firing Caps; *8*, Friction Head; *9*, Spring; *10*, Plug; *11*, Safety Spindle; *12*, Ball Bearings.

the clamps will give way and drive the firing charge into the percussion needle.

The bomb patented by Richard Machenbach and the Carbonit Sprengstoff A. G. of Germany is a missile fitted with rotating fins, which answer the double purpose of stabilizing its path and of unlocking the firing mechanism only after the bomb has travelled a certain distance, thus insuring the safety of its manipulants. Although this is no novel principle, the patenteees claim for their bomb a greater simplicity and a more efficient control than hitherto attained. The firing mechanism is provided with a further safety device in so far as the aerial propeller which unlocks the firing pin is allowed to rotate only after a given time has elapsed from the moment the bomb is released. The working of this bomb, two types of which are shown, is obvious from the accompanying diagrams.

In the Putscher bomb the firing mechanism is actuated, like in the foregoing types, by direct impact. The fuse is set on fire by means of friction

firing caps and the spring of the firing pin is blocked by a safety spindle, which must be removed before the release of the bomb.

The Bergery-Dercole bomb, which has been described in *Schuss und Waffe*, is of the rebounding type. This bomb consists of an external casing which is closed on its lower end and houses the body of the bomb proper. On striking the ground the case, which carries the firing charge, acts like

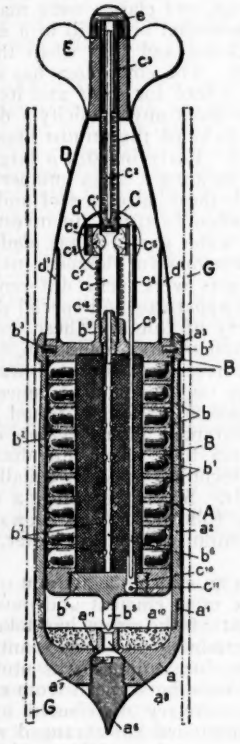


FIG. 1.

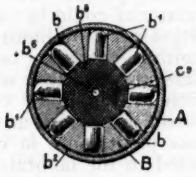


FIG. 2.

THE BERGERY-DEROCLE REBOUNDING BOMB.

FIG. 1.—Longitudinal Cross Section. FIG. 2.—Transverse Cross Section.

A, Casing; *a*, Head Piece; a_2, Tapered Part of Casing; a_9, Collar; a_{10}, Firing Charge; *B*, Hollow Cylinder; *b*, Projectile Ports; b_1, Projectiles; b_4, Projectile Retaining Sleeve; b_3, Catches; b_4, Plug; b_5, Firing Pin; b_6, Tube; b_7, Ports; *C*, Detonator; *c*, Detonator Guide; c_1, Firing Cap; c_2, Firing Pin Sliding in Tube c_3; c_4, Spring; c_{10}, Head of Rod; *D*, Shell Provided with Ports *d*; *E*, Stabilizing Fins Held in Position by Nut *e*; *G*, Launching Tube.

a mortar and imparts to the bomb proper a force opposite to that of its trajectory, causing it to rebound upon striking the target. The external and internal portions of the bomb are kept in their relative position, up to the moment the impact occurs, by suitable catches. When the outer case strikes the ground its motion is annulled, but the bomb proper, having a considerable inertia, will tend to continue on its path. The force thus generated unlocks the catches and drives the bomb with its firing pin against the detonating charge contained in the outer case, which then shoots out the bomb proper like a projectile is fired from a gun.—*Aviation*, 1/1.

OUR GREAT NEED FOR TOLUOL AND A NEW WAY TO MAKE IT.—The United States Government's needs for toluol for war purposes are just divulged as tremendous. A reliable estimate puts the figure at 22,000,000 gallons for the next 12 months. It is all to be converted into trinitrotoluol for high-explosive shells. Where this very large quantity is to come from has been

a source of considerable anxiety and is so still. Up to this time practically all of that needed has come from the by-product coke plants of the country. It appears as one of the by-products in coke-making and is recovered along with benzol in the benzol recovery plants. The present available output of the country from such plants for the next year is estimated at 11,000,000 gallons or only 50 per cent of the quantity needed.

About two years ago, there was great interest manifested in the discovery of a process for making toluol from crude oil, and claims were made that while the production was not strictly a commercial one, still in a national emergency, this process was the great back-log and that when the need came, the material could be rapidly produced. The emergency has arrived, and the nation needs millions of gallons of toluol for itself and its Allies. In the meantime, there has been going on without any publicity a development in toluol manufacture which bids fair to be of the utmost importance to the nation in the supply of trinitrotoluol. Early in 1915 a large company in Pittsburgh, which at that time was building a large number of by-product coke plants and, in connection with these, also benzol and toluol plants, started in the laboratories at the Mellon Institute, an investigation into the recovery of toluol from carbureted water gas—the gas made in all the large cities of the country by the gas companies for domestic use.

The conditions existing in water-gas plants were very different from those in by-product coke plants, and special apparatus and special methods had to be devised for the successful recovery of toluol. These were first installed in conjunction with the gaslight company at Washington, to effect the removal of toluol from 5,000,000 cubic feet of carbureted water gas per day. This plant was placed in operation on July 14, 1916, since which date there have been secured approximately 200,000 gallons of toluol. While this plant was the first to use this process, and many improvements increasing the efficiency and economy of operation have been introduced, the plant has proved to be a commercial and technical success, equalling the results promised by the laboratory methods. Since that time, a number of duplicate installations have been built as follows: two at Newark, one at Paterson, one at Jersey City, two at Trenton, two at Rochester, one at Chicago, and one at Evanston, Ill.

Now that the government has found what an enormous amount of toluol is required and that the trinitrotoluol is the most efficient and most satisfactory explosive, the Ordnance Department of the army has taken hold of the situation. It finds that every by-product coke-oven plant in the country is producing or has arranged to produce toluol to its utmost capacity, and that the remaining needed toluol must be secured from city gas. Seventy-two plants are available for this recovery distributed over the entire country. The Pittsburgh company mentioned has arranged with the government to build "stripping" plants in a number of large cities, and many more are being designed and estimated upon. The plans for securing toluol from these sources involve the use of excess refining capacity in all the by-product coke plants of the country.—*Scientific American*, 22/12.

TRINITROTOLUOL POISONING is one of the greatest dangers to which munition workers are subject, and much interest therefore attaches at the present time to the conditions under which such poisoning occurs and the precautions that should be taken against it. A comprehensive paper on the subject, by Dr. J. W. Schereschewsky, published in *Public Health Reports* for November 16, deserves general distribution in the industry concerned. In loading shells with this substance there is constant opportunity for nearly everybody connected with such work to become the subject of chronic poisoning through either the fumes or the dust of the substance. The explosive is generally introduced into the empty shells in one of two ways: the powdered substance is pressed into the shells by power presses, or molten trinitrotoluol is poured into them. The latter method is the more common and the more dangerous to the health of the workers. The

poison is readily absorbed through the skin or it may enter the system by way of the respiratory tract. Young people are especially susceptible to its effects; no worker under 21 years of age should be employed in processes bringing him into contact with it. A complete suit of overalls, fitting closely at the neck, wrists and ankles, gloves and a cap covering the hair, should be worn by all workers. Men should keep their hair short and be clean shaven. Overalls should be laundered weekly. The eating of lunches and keeping of food in workrooms should be strictly prohibited. Lastly, there should be rigid supervision of all workers by a competent physician, familiar with the symptoms of poisoning and the precautions for preventing it.—*Scientific American*, 22/12.

STEAMSHIP MOUNTS POWERFUL MORTAR TO COMBAT U-BOATS.—A new type of mortar from which powerful bombs may be discharged at submerged U-boats was mounted upon the forward deck of a British steamship which arrived yesterday at an Atlantic port. It was an additional means of defence aboard the vessel and the passengers praised it highly. They had witnessed tests during the voyage from England.

The mortar is similar to those used in the trenches, but is much larger. Its muzzle points high in the air and the bomb ascends more than a thousand feet, then falls rapidly upon the spot where it is believed a U-boat is lurking. In the tests the crew experienced no difficulty in hitting any point selected, it was said by persons on board. The explosion which followed threw a mass of water high into the air.

The steamship also had mounted upon her decks her usual number of large-caliber rifles.—*N. Y. Herald*, 23/12.

GERMAN ARMOR RIDDLED.—The German soldier's armor will not withstand the hard-hitting American bullet, it has been shown. A heavy breastplate removed from a German prisoner for a test was literally chewed to pieces by machine-gun fire after a rifle bullet fired at a good range had torn a hole in the armor as big as a silver dollar.

Even the bullets from an automatic pistol did the work it was expected they would in this respect.—*Baltimore Sun*, 20/12.

ENGINEERING

REDUCING SPEED MAGNETICALLY.—A very ingenious gear has recently been invented for use in turbine-driven ships to permit a high-speed turbine to drive the propeller shaft at its most efficient speed. This gear is magnetic, and it operates on an entirely new principle. It can be designed for a great range of reduction ratios, the apparent limits being about 6 to 1 and 40 to 1, and the higher limit can be obtained in a single step.

The principle of the gear can best be understood by referring to the diagram, Fig. 1, which represents a typical design. Here we have the driven or primary field element *A*, which is rotated by suitable clutch connection with the turbine shaft. This field element, which consists of two poles, is energized by some suitable source of current. Surrounding it are two stationary cages or stators, *B* and *C*, the stator *B* consisting of magnetic bars of laminated sheet iron mounted on non-magnetic supporting rods, while the stator *C* is built up of toothed sheets of iron. The rods and teeth are magnetically energized as they come within the field of the primary element, so that as the latter rotates it sets up a wave of magnetism that sweeps around the stators. Between the stators is the driven member *D*, also made up of bars of laminated iron. It will be observed that there are 64 magnetic bars or teeth on each stator, while the secondary or driven member has 66; so that at only two points are the teeth of the stators and the secondary in alinement. With the parts at rest and under no load this alinement will be formed in the field of greatest magnetic flux—in other words, directly in line with the poles of the driving member, as shown at *E* in the diagram.

Now, let us suppose that the driven member is held stationary while the driving member is rotated to the position *F*, as shown in broken lines. As at this point the teeth of the stator and the secondary will be out of alinement, the magnetic force will set up a torque between the teeth which will only be satisfied when the secondary is permitted to rotate far enough to bring its teeth into coincidence with the teeth of the stator and at the point of greatest magnetic flux. In other words, while the driver is moving through the angle *A O F* the driven member moves through an angle *G O F*. In a complete rotation of the driver there will be a movement of the secondary through the space of two teeth; in other words, there will be a speed reduction of 33 to 1. Of course, the driven member will lag behind the driver by an amount depending upon the load it has to carry.

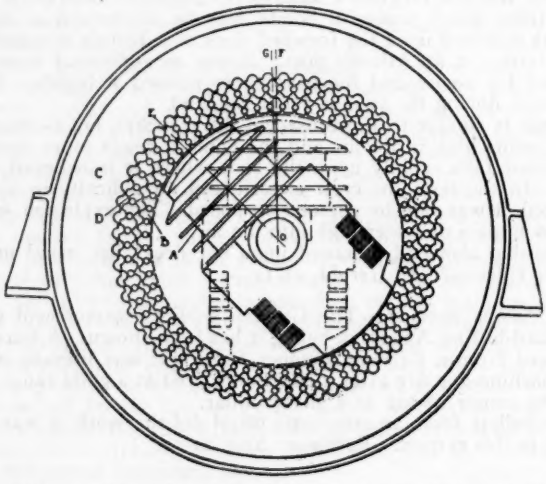


FIG. 1.—Diagram Illustrating the Operation of the Magnetic Reduction Gear.

From a brief study of this diagram it will be noted that the reduction ratio is equal to the number of secondary bars divided by the number of poles in the primary, while the number of stator teeth in each cage must be smaller than the number of secondary teeth by the number of poles of the primary. On a moment's consideration, it will be evident that if the number of teeth in the secondary is greater than that in the stator, the secondary will rotate against instead of with the driver. The torque on the secondary is not exerted by the primary, as in a magnetic slipping clutch, but is obtained by the pull of stator teeth on the secondary bars, while the primary merely furnishes the magnetic force. The secondary and stationary teeth form as many alinements as there are poles, so that if the driver is provided with more than two poles the ratio between the secondary and the stator teeth must be such as to provide the same number of alinements. Then, when the field poles are magnetized, the stator teeth will assume a position of greatest magnetic reluctance—that is, they will move into alinement with the stator teeth where the magnetic flux is greatest. Thereafter, the field cannot move without a corresponding movement of the secondary at an angular velocity determined by the reduction ratio.

This new magnetic gear is characteristic of a mechanical gear in that it has a fixed ratio of reduction for which it has been designed, and in this respect it is like a synchronous motor which when supplied with an alter-

nating current of fixed frequency will rotate at a corresponding speed; in the gear it is the speed of the driver, in place of the frequency, which determines the speed of the secondary driven element. It resembles the synchronous motor also in its ability to carry a certain maximum load before falling out of step with the driver. In designing, therefore, a suitable overload margin must be allowed above the normal operating load.

In order to corroborate the working of the principle of this gear, an experimental machine was built and to save time a stator and other parts that were on hand, were used in its construction. A photograph of this machine is reproduced herewith. It has a field with six poles. The stator consists of a single cage, which surrounds the secondary. The inner stator,

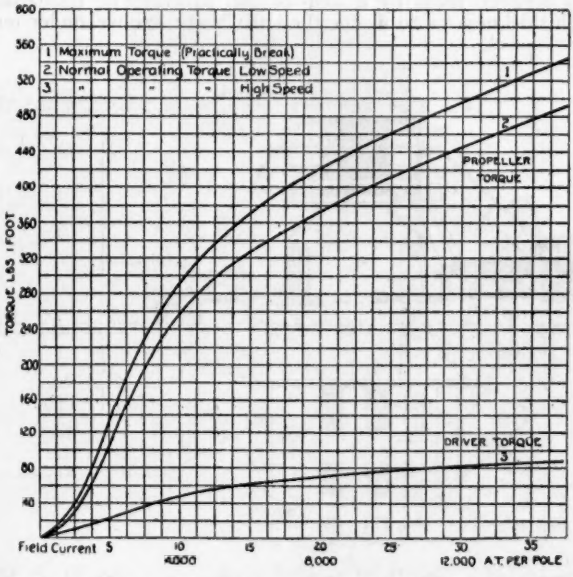


FIG. 2.—Chart Showing the Operation of the Experimental Machine.

indicated at *B* in Fig. 1, was omitted from this machine. There are 33 bars or teeth in the secondary and 27 on the stator—the reduction ratio, therefore, is 5.5 to 1. The operation of this gear is indicated in the accompanying chart, Fig. 2, in which the curve *1* represents the maximum loads the machine will carry with corresponding ampere turns per pole. It will be noted that the first part of the curve resembles the torque characteristic of a series motor while the latter part is much like a saturation curve and indicates that by increasing the pole and stator sections, the increased force beyond the bend of the curve would be made available for increasing the flux density at the bar gap and therefore adding materially to the torque of the secondary.

Based on the tests of the experimental machine, designs have been prepared for a full-sized unit, which is shown partly in section in Fig. 3, while Fig. 1 represents the arrangement of poles and teeth in the primary, secondary and stators. In the two drawings the same reference numerals are used for corresponding parts. This gear is arranged for a normal horsepower of 1500 and an overload margin of normal field of 60 per cent, reducing the speed from 3600 R. P. M. to 109, a reduction ratio of

33 to 1. This machine contains an additional stationary cage inserted between the field and secondary, the purpose of which is to increase the torque on the secondary. A torque practically double in value is produced on the secondary without increasing the core length. However, the field ampere turns must be increased to supply the necessary force for the added gap. A substantial cut in weight and an increased efficiency are the result.

The field has been especially developed to fill the requirements of high speed, balance and simple machining. It is circular in section and can be practically finished on the lathe and boring mill.

The field copper, wound directly in circular grooves turned in the core, comprises a bare strip insulated from the core by substantial insulating plates and between turns by a strip of fish paper. The insulating plates are of such thickness as to wedge the strip in the groove under tension so

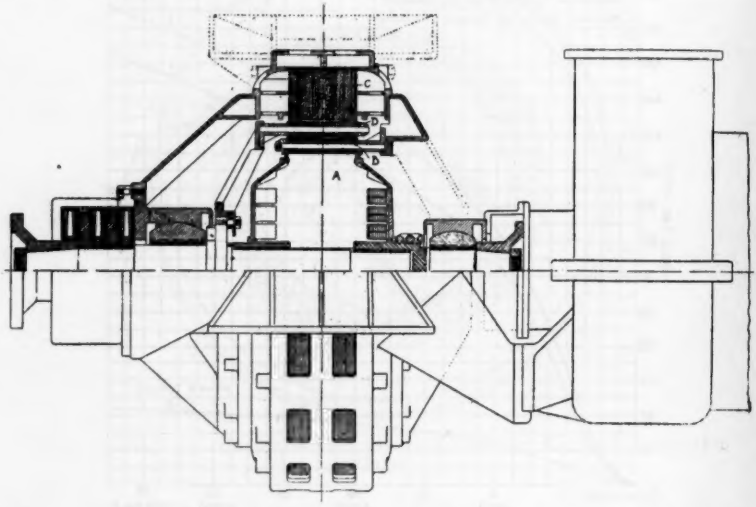


FIG. 3.—Design of a 1500 H. P. Gear Reducing from 3600 R. P. M. to 109.

that once wound and held by a bronze wire hand, the considerable centrifugal forces will be unable to displace it and thus cause unbalancing. The separating flanges serve to form a plurality of grooves to prevent a cumulative strain on the outer flange and to make possible a strip of reasonable width. Each groove contains two layers separated by an insulating plate and wound in opposite directions so as to bring all leads to the outside for easy connection.

Particular attention has been paid to the design of the cages. Their present arrangement combines the greatest possible section in the laminated bars with maximum strength of the non-magnetic supporting rods. A non-magnetic ring having axial holes drilled through, into which the rods are pressed, serves as the supporting member for the laminated bars each of which is forced between adjacent rods and insulated from them by a fiber tube on the rods 1/16-inch in thickness.

The rings, in turn, are screwed to the spider of the secondary and the stationary end bracket of the stator respectively. A narrow ring, insulated from the rods, ties each of the cages on the other side and thus makes the cages thoroughly rigid. Screwed to the spider of the secondary cage is the main or driven shaft which extends through the bore in the field so that

the field is partly supported by and rotates around the main shaft on bearings provided on either end. The two main bearings, one at the end of the main shaft and the other on a stub extension of the field sleeve, support the weight of the primary and secondary and thereby make the gear unit independent of the turbine and propeller-shaft bearings.

The main, and particularly the internal field bearings are oiled by pressure circulation, the oil being introduced into a circular groove in the center of the left-hand main bearing through a hole; from the groove into the center hole of the main shaft through several evenly spaced radial holes; out at the right end of the shaft and back through axial grooves in the bearing surfaces into a circular pocket of the spider and through holes

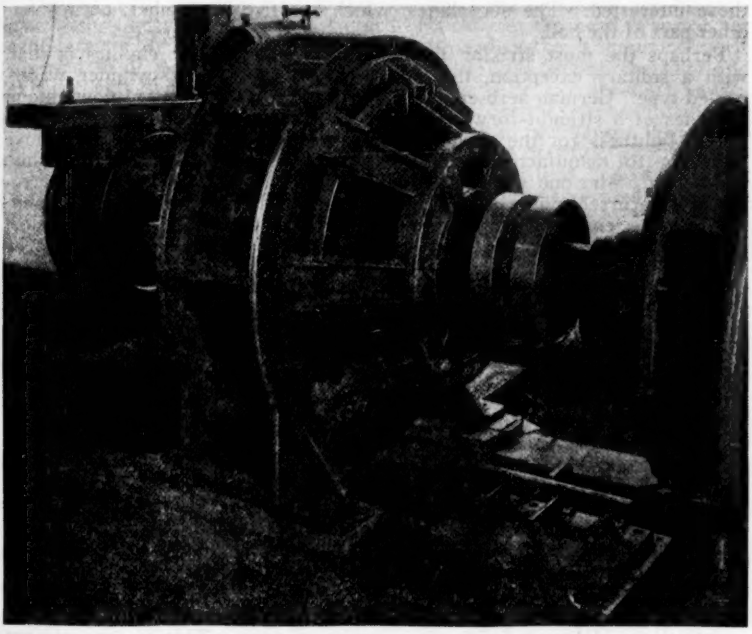


FIG. 4.—The Experimental Six-Pole Machine Which Gives a 5.5 to 1 Reduction.

back into the reservoir of the main bearing. In order to reduce the windage losses to a minimum the high velocity field member is entirely enclosed by aluminum plates on either side screwed to the field with a thin strip fastened to the plates and enclosing the outer circumference, so that externally the whole resembles a smooth drum and offers little resistance to rapid rotation.

The weight of this unit including the thrust bearing is estimated at 24,000 pounds, which, it will be noted, is less than 50 per cent the weight of a mechanical gear for a similar duty.

The losses are made up of the exciting loss, which in this design is normally 4.5 K. W. or about one-third of 1 per cent, the iron loss and the windage and friction losses and the total should not exceed 2 per cent, making the efficiency 98 per cent. The inventor and designer of this ingenious gear is A. H. Neuland of Bergenfield, N. J.—*Scientific American.*

GERMAN AEROPLANE ENGINES.—The Royal Agricultural Hall at Islington will not be the scene this year of the usual Christmas show of livestock and agricultural machinery. The hall is not, however, wholly dissevered from its normal functions, as a part of the building has been devoted by the authorities to a small, but most instructive exhibition of captured German aeroplanes and engines. The object of the exhibition is educational, and for the convenience of manufacturers and others interested in aero-engine design, several engines have been dissected, and sets of the component parts, sectioned where necessary to show the construction, have been mounted on large boards, alongside specimens of the engines to which they belong. There are altogether some dozens of captured engines either officially on view, or rendered visible, by the courtesy of the attendants, to those interested. The aeroplanes, which are five in number, occupy another part of the hall.

Perhaps the most striking fact in connection with the engines is that, with a solitary exception, they are all of the vertical 6-cylinder water-cooled type. German aero-engine design seems to have settled down along the lines of a straight-forward racing-car engine, not perhaps of extraordinary lightness for the power developed, but reliable, durable and above all, easy to manufacture in quantities with ordinary labor and shop equipment. The one exception to this type is a specimen of a 100-horsepower Oberursel engine which formerly adorned a Fokker fighting monoplane. This engine is of the 9-cylinder rotary air-cooled pattern, almost indistinguishable from the Gnome rotary engine, which is largely used by the British authorities. It has the typical Gnome pistons carrying automatic inlet-valves in their heads, and in other features the resemblance is exceedingly close.

Reverting to the standard 6-cylinder engines which really constitute the exhibition, these comprise the following types and sizes, namely, Mercédès 160-horsepower and 260-horsepower; Benz 160-horsepower and 220-horsepower; and Argus 120-horsepower and 200-horsepower. The Argus engines differ from the others in the fact that the cylinders are in pairs, one sheet-iron water-jacket enclosing two cylinders, but as these engines have not yet been sectioned it is not possible to see the details of the cylinder construction. One of them is equipped with an English carbureter and English magnetos, and we believe that many captured German engines have been found thus equipped. It is said to be the German practice to design their engines to take British accessories and so to be able to utilize valuable fittings stripped from our machines which have come to grief behind their lines.

The Argus engines are also noticeable by reason of the amount of labor spent on the elaborate finish of unimportant parts. This is certainly not a typical failing of German engines, for these as a rule display a common sense in the matter of finish, and of simplicity of detail, which our own manufacturers might emulate with advantage. On the whole, in so far as it can be inspected, the Argus engine does not apear to have any extraordinary merits, while in certain details, such as the use of loose cams secured by taper pins, the design is anything but commendable. On the whole, one probably would not be far wrong if he said that an equally good, or better, engine could be made for less money.

The real interest of the exhibition to designers of aero-engines lies in the remaining types, the Benz and Mercédès. These appear to represent the outcome of German experience as to what an aero-engine ought to be, at any rate for such work as long-distance bombing flights if not for more spectacular duties. The Gotha biplane carries two 260-horsepower Mercédès, the A. E. G. is similarly equipped, and the Rumpler biplane is fitted with a single engine of the same power and pattern. Benz engines of 220-horsepower are carried in the Aviatiks and the Agas. The Albatross two-seater carries a 160-horsepower Mercédès.

The Benz and Mercédès engines are, broadly speaking, of the same general pattern, each having six independent vertical water-cooled cylinders, with sheet-iron welded jackets, and both representing the final development of their racing-car prototypes. They weigh, we understand, about 3.75 pounds per normal brake horsepower at ground level, this figure comprising a complete engine, but without radiator, fuel, oil, or tanks. Of the two the Benz is slightly the lighter per brake horsepower, and from the manufacturing point of view the details of its design are generally preferable to those of the Mercédès. The 160-horsepower Mercédès aero-engine of pre-war days had cylinders in pairs, like those of the Argus, and the crankshaft was also of peculiar design, but these features have been abandoned in the modern engines.

Dealing with the points of difference, the Benz cylinders are of cast-iron with solid valve-seatings arranged vertically in the head, whereas the cylinders of the Mercédès are of steel with exhaust and induction ports screwed in at an angle. In both sizes of the Benz engine the inlet and exhaust valves are duplicated, and are operated by a crankshaft housed in the crankcasing. In the Mercédès engine a central overhead camshaft is adopted and duplicate valves are only used in the larger size. The casing of this camshaft appears a very costly piece of work, and the Benz design seems unquestionably better. The Benz pistons are of cast-iron with three rings at the top and no scraper ring. A perforated steel cone is riveted to the inside of the piston-head, the apex of the cone forming a small seating on the center of the gudgeon-pin. The function of this cone is probably to assist the lubrication of the pin, although the support it affords to the latter may be useful. The piston of the Mercédès is formed by screwing a steel head, carrying the gudgeon-pin bosses, into a cast-iron skirt. The design of the connecting-rods also shows considerable difference. The Benz rods are of parallel tubular form, involving only lathework of a simple kind, whereas the Mercédès rods are of the usual I-sections which gives greater trouble in machining.

Coming to the crankcase, in both engines the lower half of the case forms a support for the crankshaft so that the bearings and connecting rod-ends are very inaccessible when the engines are erected. This would appear to be an objectionable feature of both designs, unless it has been found that sufficient rigidity is not obtainable otherwise. There are no ball-bearings for the crankshaft of either engine, except for the thrust bearings. Oil cooling is arranged for on the Benz engine by a number of horizontal tubes passing transversely through the sump. A cowl on one side of the casing directs air into the tubes, and a similar cowl on the other side, facing backwards, assists the draft through them. In the same engine the crankshaft bearers are also cored transversely from side to side, so that the air-circulation may tend to cool the bearings, and through two of these ports the air is drawn to the carbureters. The induction-pipe system of the Benz compares favorably with that of its rival and the water circulation system seems pronouncedly superior. On the other hand the circulating pump of the Mercédès, with its shrouded impeller and volute discharge is of much superior design to that of the Benz.

The general impression left on the mind by an inspection of the captured engines, is that the Germans have carried the standardization of type infinitely further than we have, and therefore have placed themselves in a position to manufacture aero-engines with the maximum rapidity and cheapness. We have certainly captured many hundreds of German engines, and it is only reasonable to suppose that the collection at the Agricultural Hall is fairly representative of the bulk of those now used against our troops in Flanders and our civilian population at home. It is therefore a matter for remark that, except for the solitary Gnome engine, the Germans appear to have abandoned, or never to have used, the rotary type, the radial fixed type, the Vee type, the opposed type or the Broad Arrow

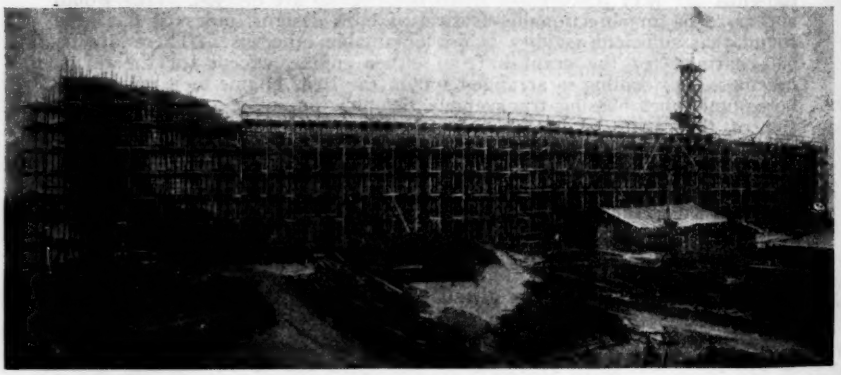
type, not to speak of the numerous variants which each of these types comprises. They pin their faith, apparently, to a simple engine with the minimum number of parts, and devote their energies to increase of numbers rather than to the development of types. That "it is lawful to learn from the enemy" is a maxim as old as the art of war, and though our designers might gather some useful lessons from the engines exhibited, and notably from the Benz engine, we think that the most important lesson of all is to be learnt by reflecting upon the contrast between the present exhibition, and one which would be equally representative of current British practice.—*Engineering*, London, 14/12.

NAVY SHIP REPAIRS.—During the past year a greater volume of work has been performed under the Navy Department bureaus of steam engineering and construction and repair than ever before. Every navy yard is working to the extent of its capacity and employing the force overtime. In addition to that a large part of the repair work has been assigned to private plants under contract.

It has been found that the merchant ships, and especially the interned enemy vessels, taken over by the Navy Department, have required, almost without exception, a great deal of repair work, showing that in most cases the vessels were badly run down.

The destroyers and other craft that have been sent to foreign waters have given an admirable account of themselves in the freedom from disability. Much repair work of a minor nature is done by the ships' forces, and more extensive repair work now is possible abroad by the presence on the European station of the repair ships *Dixie* and *Melville*, the operations of which are in charge of Commander Albert T. Church, who, while on duty at the Navy Department in the bureau of steam engineering, had a great deal to do with the equipment of those vessels.—*Washington Post*, 10/1.

FIVE-THOUSAND-TON REINFORCED CONCRETE SHIP BUILDING IN CALIFORNIA.—One of the most daring experiments in concrete ship-building is the project now under way at Redwood City, Cal., where the San Francisco

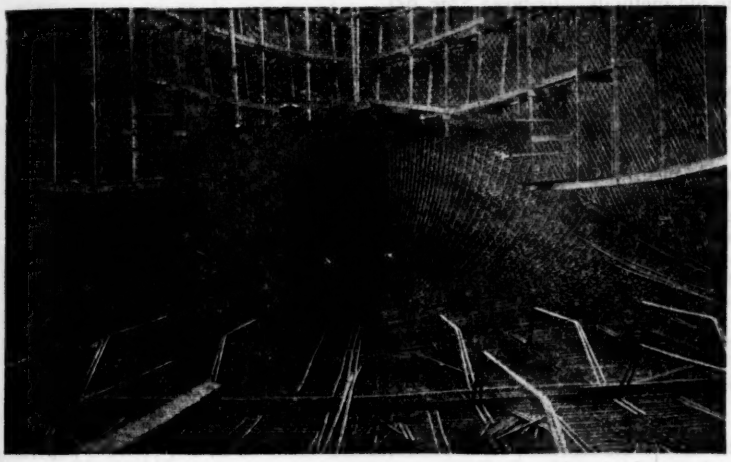


FIVE-THOUSAND-TON REINFORCED CONCRETE VESSEL UNDER CONSTRUCTION AT REDWOOD CITY, CAL.

Ship-Building Company is building a reinforced concrete freight steamship of 5000 tons' deadweight carrying capacity on a draft of 24 feet. The vessel is 320 feet long, 45 feet beam and 31 feet depth molded. She will be fitted with Scotch boilers and a triple expansion reciprocating engine of

1750 horsepower designed to give the vessel a speed of 10 knots at sea. Tank storage space for fuel oil will be provided sufficient for 30 days' steaming at her designed speed.

Some idea of the size and details of construction of the vessel can be gained from the photographs reproduced herewith, which show the progress of construction about December 1. The officers of the San Francisco Ship-Building Company, which is building the vessel, are: President,



INTERIOR VIEW AT BOW.

W. Leslie Comyn; vice-president, John Lawson, of Balfour, Guthrie and Co.; secretary, Kenneth MacDonald, of MacDonald and Kahn, and treasurer, George U. Hind. Messrs. Leslie Comyn and John Lawson, acting as an executive committee, exercise active management of the affairs of the company.—*Marine Engineering,* January.

AERONAUTICS

THE NAVAL ACADEMY AIRCRAFT FACTORY in a Pennsylvania city is, according to *The Army and Navy Journal,* completed and in operation. This plant, which covers three acres, the main building being 400 by 400 feet, was begun in August last. The structure was completed in November, the machinery installed, and the keel of the first flying boat laid within 90 days after construction started. The plant and its equipment cost the work necessary in the manufacture of seaplanes. Machinists are needed to operate the plant to its full capacity.

Almost every type of craftsman can help in some of the many kinds of work necessary in the manufacture of seaplanes. Machinists are needed to make and assemble the parts. Sheet-metal workers, acetylene welders, braziers, bicycle tube benders, coppersmiths, and wireworkers are all needed, and there is a demand for cabinet-makers, pattern-makers, boat builders and joiners. Women are needed to sew covers on the wings of the planes, and also to do some of the lighter woodwork.

The League Island Navy Yard, Philadelphia, is the place to apply for employment in the new naval aircraft factory.—*N. Y. Times,* 13/1.

HURRYING PLANS FOR ESTABLISHMENT BETWEEN FRANCE AND ENGLAND.—Plans for the establishment of an aerial postal service between France and England are rapidly approaching realization, and it is now believed that such a service, on a limited scale, will be put into effect without waiting for the end of the war. It will be used only for carrying official correspondence, especially that of the inter-allied committee sitting at Versailles. Reports and communications from the American representatives thus will catch the mail boats from England in about two days' better time than by the old methods.—*Evening Star*, 9/1.

U. S. NO AIR POWER IN SPRING.—Germany will have nothing to fear from the United States air-fighting forces during the coming spring, because the American aircraft program is "far behind" its schedule, according to Major William A. Bishop, winner of a Victoria cross, who addressed the Canadian Club at Montreal on Friday.

Major Bishop characterized as "unfortunate" the advertising which has been given the United States Government's aircraft program. He said that while France would find it impossible further to enlarge her airplane fighting forces during the coming half-year, Germany, knowing America's intentions, has greatly expanded her flying corps in an effort to gain supremacy in air warfare. Consequently, he declared, during the next few months Great Britain will have "to face the most terrible time she has yet faced, and especially from the point of view of war in the air."

America's assistance in maintaining allied air-fighting superiority "may be felt" by summer, but during the spring months Major Bishop said "the United States will not be a factor for the Germans to reckon with in the air."—*Washington Post*, 13/1.

REPORT OF THE U. S. NAVAL OBSERVATORY.—In his annual report to the Bureau of Navigation, Rear Admiral Howard, U. S. N., retired, superintendent of the Naval Observatory, refers to aviation instruments as follows:

"In conjunction with the station at Pensacola and other commands engaged in flying, the observatory has practically accepted as standard an altimeter (altitude aneroid barometer) and a clock. A compass for aircraft has been adopted and issued but is not proving entirely satisfactory, and further experiments are under way.

"One form of statoscope for dirigibles has been found satisfactory for certain purposes and will be issued to each dirigible when delivered. This is the Custer type. This instrument is non-luminous and does not indicate speed or amount of change of height. The observatory is assisting various inventors and makers of instruments to devise a statoscope that will answer all requirements.

"The observatory has on hand a small number of airplane cameras of acceptable design. These are not fixed in the car and their value will have to be determined in service. Other forms of cameras are under trial.—*Aviation*, January.

WHEREIN GERMAN CONSTRUCTORS SHOW GREAT SAGACITY.—Time and again it has been admitted in this column that the Teuton is a formidable aerial enemy. And somehow or another he has always been able to keep up with the combined production of Great Britain, France, Italy and Russia, not forgetting such aid as the Allies have received from the American constructors prior to our entering the world war. Just why this Teuton efficiency should remain manifest in the face of what appears to be an overwhelming handicap, is now beginning to be understood. The cardinal fact is that the Teuton, from the beginning, has considered the aeroplane in the light of a big motor fitted with a pair of wings. When the Allies built machines with 80-horsepower rotary engines at the beginning of the war, they found themselves competing with German planes fitted with

120-horsepower Mercédès engines. Needless to say, the allied machines were hopelessly outclassed; and on the side of the Germans the lack of numbers was made up by the superiority of the unit. Then the Allies went to the 100- and 120-horsepower plane, only to find that the Teuton had already gone to 160, 200 and 220 horsepower. Always have the allied planes been underpowered; and in order to increase climbing and speed characteristics the British and French constructors have had to shave off every ounce of cloth and wood possible to a point where the factor of safety is little more than a name. On the other hand, the Germans, working with a solidly-built machine, meet climbing and speed requirements merely by piling on more horsepower. We Americans have done well in developing the Liberty motor first, before our aeroplanes: for after all the Teuton is quite right: an aeroplane is nothing more than a powerful, reliable motor—with a pair of wings—*Scientific American*, 24/11.

MATERIALS NECESSARY FOR SINGLE AIRPLANE EXCLUSIVE OF ENGINE.—The following figures have been received from the Signal Corps, Aviation Section, of the materials necessary for a single airplane of the more simple type, and exclusive of all the materials necessary for the engine:

Nails		4326
Screws		3377
Steel stampings		921
Forgings		798
Turnbuckles		276
Veneer	square feet	57
Wire	feet	3262
Varnish	gallons	11
Dope	gallons	59
Aluminum	pounds	65
Rubber	feet	34
Linen	square yards	201
Spruce	feet	244
Pine	feet	58
Ash	feet	31
Hickory	feet	1½

—*Official Bulletin*, 29/12.

THE LANZIUS SPEED SCOUT.—The Lanzius speed scout is, unlike most present-day airplanes, a machine in which the incidence of the wings may be altered in flight at the will of the pilot.

Such an idea is not wholly new. Aeronautical investigators have predicted for years such a possibility. Indeed, Captain Duchène in his celebrated work, "The Mechanics of the Airplane," dwelt with considerable force on this subject, and prophesied the adoption of the principle of variable incidence in future machines, to reduce or augment the drag which would give the pilot opportunity to check or increase his speed. He pointed out that existing difficulties "may be eventually overcome by the invention of the variable surface machine, which would permit a high speed to be maintained in normal flight while starting and landing could be accomplished at slow speed."

A machine based on this principle was produced in 1912 by Paul Schmitt, a Russian engineer living in France, and fully proved the correctness of the theory of variable incidence. This machine broke at the time several world's records for flights with five and more passengers. (A description of the Paul Schmitt airplane appeared in the October 1, 1917, issue of *Aviation and Aeronautical Engineering*.)

George Lanzius, a Hollander, who was working on this very theory at that time and built models of the same as early as 1911, continually improved his design until during the early part of 1917 he constructed a

machine incorporating these features, which was successfully demonstrated in flight.

The outstanding features of this machine are:

1. A cantilever frame, rigidly constructed to support the planes.
2. Planes pivoted in frame capable of being operated by pilot from 0 to 15 degrees.
3. Ailerons pivoted on plane tips under the angle of about 15 degrees, movable in opposite directions transverse to the planes.
4. A distinctive system of lateral control.

The machine is entirely built of steel, except for the wing frames. No wiring is used in the construction of the body, all members being joined by riveting. The cantilever frame is built up of stream-lined tubing and the wings are pivoted on this frame at the will of the pilot by means of a fixed worm-gear.

The wings are built up in the usual way of wooden frames and are covered with fabric. The drift wires do not run to the radiator frame but are fastened to the upper longerons of the body. The skeleton of the machine weighs complete 380 pounds.

The under carriage is built up of stream-lined V-struts and is equipped with resilient Ackerman wheels, which obviate the necessity for special shock absorbers. The control is of the stick type.

The characteristics of the Lanzius Speed Scout, as furnished by the manufacturer, are the following:

Span, upper plane	29 ft.
Span, lower plane	24 ft.
Chord, upper plane	4 ft.
Chord, lower plane	3 ft. 6 in.
Overall length	24 ft.
Overall height	8 ft. 6 in.
Weight, empty	1200 lb.
Weight, loaded	1800 lb.
Engine, Sturtevant	210 h. p.
High speed	140 m. p. h.
Low speed	40 m. p. h.
Fuel capacity	4 hrs.

—*Aviation*, January.

UNITED STATES AIRCRAFT PRODUCTION.—Howard E. Coffin, chairman of the Aircraft Production Board, has issued the following statement:

July 24, 1917, the date of the President's approval of the aircraft act, providing for the creation of the United States Military Air Service and providing $640,000,000 for its maintenance, marks the real beginning of aircraft history in this country.

About half of this amount appropriated was provided for the purchase of aircraft, of aircraft armament and equipment, and the remainder for the building up and maintenance of an air-service personnel greater than that of our entire standing army of a few months before.

At about this same time also our close contact with the allied air services was established through a strong military, technical, and industrial mission of more than 100 men sent to Europe. As a result of conference the policy of aircraft development mapped out for this country at that time was sevenfold.

This policy remains practically unchanged, and is as follows:

1. The United States to establish and maintain a great system of training stations, adequate both in ground schools and flying schools, to provide preliminary training for the personnel schedule.

Twenty-four great training stations were authorized under the bill to be built in accordance with the requirements scheduled in the air-service program. Nine grounds for the preliminary training of the flying personnel

in technical matters were planned at nationally known universities. Both lines of work have been completed in accordance with schedule almost to a day. More than half of these training stations are already in full operation, and the others under construction in strict accordance with the general plan.

2. To accomplish an international standardization in aircraft materials, in detail of design and types, and to achieve such coordination of effort as would concentrate the manufacturing facilities of the various allied countries upon the minimum number of types of those machines for which the producing equipment was best fitted.

International specifications for aircraft materials have been prepared under the direction of the board by a committee representing the allied countries. A complete coordination of manufacturing facilities and policies has been agreed upon between the allied powers. Standardization in types, designs, and materials will continue to be carried forward under international agreement already in effect.

3. To construct primary training machines of quality and quantity approved by the Joint Army and Navy Technical Committee.

The production of standardized training machines approved by the Joint Army and Navy Committee will be in excess of the needs of the program by January 20. The production of these machines has been behind schedule because of the necessity for supplying training engines from this country to meet Canada's considerable requirements and because of the difficulties of a sudden increase of a manufacturing industry inadequate to the task.

4. To provide, equip, and train personnel for flyers and mechanics in accordance with schedule recommended by the Joint Army and Navy Technical Committee

This program is progressing exactly on schedule. The training of both flyers and mechanics is provided for in this and in allied countries. Thousands of mechanics are being put into actual service with the allied forces. Trained men will be released as needed in the United States Air Service and their places kept filled with fresh material. Four of the northern flying schools near manufacturing centers have, in accordance with the training plans, been turned into mechanics' schools during the winter months. American flyers are in training in the United States and abroad and it is probale that the original program for pilots will be increased. The personnel for such increase is already available.

5. To provide raw and semi-finished materials and finished parts, including motors, to insure the consummation of the augmented allied aircraft-building programs.

This has been and is being done. All of the allied nations are in considerable degree dependent upon materials and parts shipped from the United States. It is vitally important that the American aircraft program be not permitted to interrupt this flow of materials to the Allies.

6. To provide for the equipment of the American forces in France for the period of January to June, 1918, in large part by purchase of fighting machines manufactured in allied countries, and to supply the machine tools and raw and semi-finished materials necessary to insure their production.

One of the first acts of the Aircraft Board after the passage of the appropriation bill in July was to authorize the placing by General Pershing of orders for several thousand fighting machines in allied countries. This action was taken to insure adequate equipment of the American forces prior to June, 1918, in case of expected delays in manufacture and shipment of American-made service planes. Many millions of dollars' worth of materials and machine tools have been shipped from this country to aid this production.

7. To provide completed service machines, including combat and bombing types, for American need after July 1, 1918, and for such shipment of the finished product overseas as tonnage might permit.

In accordance with the plans originally agreed upon with allied governments, it was deemed advisable to provide for advanced training overseas adjacent to the actual theater of military operations, but so energetic has been the work of the personnel division of the Signal Corps that the training facilities thus provided have been soon overcrowded, with resultant request that early arrangement for advanced training be made in America. To meet this change in program, delivery of advanced training planes will begin this month and within 90 days will have met requirements. The engines of foreign design for this advanced training schedule are already in quantity production in this country.

In discussing the accomplishments of the air service in the consummation of the army program, it will be well to point out the impossibility of certain proposals enthusiastically and persistently put forward by word of mouth and in the press. We have seen and heard much of the proposal of "100,000 airplanes" to be provided by the United States within the next year. In a country where one great industry produces a million and a half motor cars per year the fabrication of a hundred thousand planes might seem easy, but actual figures based upon three years of practical experience in the war show that there are now between 40 and 50 men of the auxiliary services required for each active machine at the front. If this same ratio should be adhered to in our service it would mean that some four million men would be required in our aeronautical department on foreign soil between our ports of debarkation and the fighting front.

Even though this number of men could be reduced by 50 per cent by increased efficiency and standardization, the number required is still staggering. Consider, also, the overseas transportation problem as related to material only and without reference to personnel and its maintenance. The transportation of finished planes, properly crated, with the necessary spares, accessories, and equipment is in itself a serious problem, in view of the situation in ship tonnage.

Again, the problem of proper housing behind the battle lines in Europe of such great numbers of planes as are carelessly discussed may well be left to sober thought.

Every policy in the development of the American Air Service has been decided upon recommendation of our technical advisers in daily consultation in allied countries, and under advice of an inter-allied staff of half a hundred experts assigned to our air service in the United States.

Every decision of the Aircraft Board has been based upon the military policies of the front. Daily cable communications with allied countries are maintained. The freest possible exchange of information, machine designs, and aircraft experts with foreign countries is in effect. Airplanes and engines of the very latest European development are going into production in the United States as quickly as, and perhaps more quickly and in greater quantities, than in allied countries. The feat of getting the 12-cylinder U. S. A. or so-called Liberty engine from the first scratch on paper in June to the beginning of production of quantity manufacturing tools in November is one never equalled even among the spectacular performances of the American motor-car business.

In June, from one to three weeks were required to deliver a properly authorized contract to a manufacturer after all details of the negotiation had been settled. To-day, a few hours only are needed. The slowness of the government departments in paying for the goods delivered has been a contractor's complaint of long standing. For 60 days past, in the disbursement of millions, no Signal Corps account properly presented has remained unpaid longer than one day after the delivery of the material.

Wherever facilities for manufacture have been offered which have seemed to promise reliable sources of supply in considerable quantity, investigation has been made by industrial experts to determine the value of these concerns in connection with the production program. Obviously, dependence for deliveries of the types of machines standardized by the

War Department could only be placed upon large concerns amply financed and controlled by organizations familiar with the processes of duplicate quantity production.

Since the passage of the aircraft bill in July, hundreds of concerns have asked for contracts to manufacture planes. Inasmuch as an organization of government accountants, inspectors, and production men must be maintained in each plant engaged upon the aircraft program, the complication, expense, and general impossibility of splitting up the work among a multitude of small contractors, each capable of producing but a few machines, should be clear. The government's best interests lay in safeguarding delivery in the most efficient way and at the lowest price, and required the building up of a nucleus of strong concerns to serve as the backbone of the aircraft program. Should the allied governments contemplate, as the war progresses, a further extension of American producing resources, there will be no difficulty in building up new sources of supply in every line of the work.

The policy pursued by the War and Navy departments, under direction of the board, has of necessity brought criticism from many quarters upon the part of small concerns or upon the part of those institutions unfitted because of location or of labor or other unsatisfactory conditions. Contracts have been requested upon the part of many concerns minus experience in the manufacture of such highly specialized goods and having not the slightest comprehension of the intricate ramifications involved in airplane and airplane-motor construction.

New sources of supply, flying fields, the experimental laboratory, and other activities under the direction of the board have been purposely located west of the Allegheny Mountains, in accordance with the stated policy of the military departments, to remove sources of war supply "200 miles from the seacoast," and to avoid the labor congestion which exists in all eastern industrial centers. The reasons for such a policy are too obvious to require comment.

Established plants of the motor car industry are being largely utilized in the program of aircraft-motor production, but automobile concerns are not being employed in airplane construction. In general, the statement may be made that not a single automobile factory is in any way involved in the plane-building industry. The reasons for utilizing the motor-building talent of the third largest of the world's industries permit no argument.

There has been established in Paris under the direction of the Aircraft Board a joint army and navy aircraft committee to coordinate the activities of army and navy in foreign territory and to form a direct channel of contact between the inter-allied aviation committee and the Aircraft Board in Washington.

The board has arranged with foreign governments for a free interchange of manufacturing rights and patents governing aircraft for the duration of the war. Endless business negotiations with foreign private interests have thus been avoided and delays have been eliminated and the expenditure of many millions of dollars prevented.—*Official Bulletin*, 11/1.

MERCHANT MARINE

SKINNER AND EDDY LAUNCH FIRST SHIP FOR UNITED STATES SHIPPING BOARD.—Before 15,000 spectators the steamship *Seattle*, the first ship to take the water under the United States Shipping Board's contracts, was launched at the plant of the Skinner and Eddy Ship-Building Corporation, Seattle, Wash., on Saturday, November 24, at 12.30 p. m. To commemorate the event the Shipping Board permitted this ship to be christened with the name of the city which had turned out their first product.

Under the Shipping Board contracts the *Seattle* received the official number 83, that many contracts having been awarded before the Skinner and Eddy Corporation received their six. As the *Seattle* is patterned after

the same design as the other 8800-ton cargo carriers turned out by that plant, everything was ripe for a speedy delivery of this ship, and within 77 working days after the keel was laid, Dave Rogers, the works manager, and his band of loyal workers had this ship in the water.

The sponsor for the *Seattle* was Mrs. Ernest Lister, wife of Governor Lister of Washington.

The *Seattle* is the eleventh ship turned out by the Skinner and Eddy yard in less than 20 months, number 10 being the *War Flame*, which was launched in 64 working days from the day the keel was laid, thus establishing a world's record for the construction of ships of the 8800-ton deadweight class.

At the same moment the *Seattle* was launched the Ames Ship-Building and Dry Dock Company, of Seattle, launched their first product, which is called the *War Brigade*.

Two more launchings are scheduled at the Skiner and Eddy plant before December 31, and during the next year it is expected that more than 14 ships will be sent down the ways at this plant.—*Marine Engineering*, January, 1918.

VESSEL LAUNCHED AT YARD BEGUN SEVEN MONTHS AGO.—A telegram to the Shipping Board told of the launching at Los Angeles of the first steel merchant ship contracted for by the Emergency Fleet Corporation. The vessel was one of eight of 8800 tons' capacity each ordered May 12 from S. L. Napthaly.

Turning out the vessel within seven months, when the yard in which it was built had to be constructed after the contract was awarded, was hailed by Shipping Board officials as demonstrating what American industry can do in an emergency.

One vessel contracted for by the Emergency Fleet Corporation already has been launched, but it came from the yard at Seattle, which has been in operation for many years.—*N. Y. Herald*, 17/12.

OUR SHIPBUILDING PROGRAM.—Writing recently in *Sea Power* Walter R. Alexander, attorney of the United States Shipping Board, states in part that "the following table is a summary of the complete ship-building program of the board:

	No.	Deadweight Tonnage
Ships which were requisitioned by order of August 3, 1917.	403	2,800,000
Ships for which contracts had been let September 22, 1917, under program for new ship construction	636	3,124,700
Program contemplated under additional authorization of Act of October 6, 1917	600	5,000,000
	1,639	19,924,700

All of the vessels represented in the above program will be suitable for overseas commerce. As a basis for comparison it may be stated that at the commencement of the present world war the United States had less than 1,000,000 tons deadweight of ships registered for foreign trade, and has at the present time about 4,571,000 tons deadweight registered therefor."—*Scientific American*, 29/12.

MAY TAKE SAILING SHIPS.—Requisitioning of all American sailing vessels was forecast to-day when the Shipping Board requested the Department of Commerce to report the location of such vessels. Secretary Redfield replied that 175 sailing vessels, with a cargo-carrying capacity of 425,000 tons, now are within or adjacent to American territorial waters.

There are nearly 500 sailing vessels of 1000 tons or larger flying the American flag, and it is being urged that in this time of stress, when the liberty of the world depends on shipment of food and supplies to Europe,

the vessels should be taken from private business and put into the public service.

Of the 175 vessels which could be made immediately available, 76 are in ballast, 90 are loaded and 9 are undergoing repairs which will be finished soon. The other vessels are scattered.—*N. Y. Times*, 4/1.

NAVAL CREWS FOR MERCHANT VESSELS.—If it were some new theory advanced in favor of a special interest the question of manning merchant vessels with naval crews or with a definite proportion of naval crews might be open to further inquiry and discussion. But behind this proposition is a solid body of practice established during eight months' experience of war and demonstrating that the conditions on board chartered commercial vessels have been detrimental to the efficiency so vitally demanded.

No reflection on the skill and patriotism of merchant officers enters, nor does any proof exist that naval officers and crews embarked have in such circumstances assumed to exercise any undue authority, but clashes have been frequent between the two elements and transportation has suffered. War is war, and the organization of merchant vessels, however well suited to ordinary voyages in peace, does not lend itself either in kind or degree to the new and strange requirements of hostilities. Then, too, naval discipline varies in many essentials from that enforced in the mercantile marine, and this alone must result, and has resulted, in the friction and danger created.

Relief is promised for these anomalous conditions. The sub-committee of the House Naval Committee inquiring into the navy's conduct of the war will, it is reported, recommend legislation for manning merchant vessels with enlisted men of the navy. The scope of this intended measure has not been revealed, but it is a departure in a right direction and it is hoped that Congress will accept it, a proper recognition of the rights of merchant officers and a due regard for their susceptibilities being observed.—*N. Y. Herald*, 11/1.

FORTY-ONE SHIPS BY END OF FEBRUARY.—Forty-one ships of approximately 300,000 tonnage will be delivered to the Emergency Fleet Corporation from their ways by the end of February. This announcement was made to-night by E. N. Hurley, chairman of the United States Shipping Board.

These ships were requisitioned from private owners by the government for war purposes. Eighteen of them will be completed during January, with a total deadweight tonnage of 145,091. Twenty-three will be finished by the end of February, with total deadweight tonnage of 182,061.

These ships for the most part are cargo vessels and tankers.

Their place of delivery, builders and type follow:

Seattle—Seattle Ship-Building Company, three cargo ships; Skinner and Eddy, one tanker, one cargo; Ames, two cargo.

Portland, Ore.—Williamette, three cargo; Albina, two cargo.

Oakland, Cal.—Moore and Scott, three cargo.

Newport News—Newport News Ship-Building and Ddrydock Company, one cargo, one tanker.

Quincy, Mass.—Bethlehem—Fore River plant, two cargoes.

San Francisco—Bethlehem, one cargo, three tankers.

Columbia River or Puget Sound—Duthie, four cargoes; Columbia, one cargo.

Baltimore—Baltimore, two cargoes.

Philadelphia—Cramps, one passenger and cargo.

Port of New York—Cramps, two cargoes and passenger.

Gloucester, N. J.—Pennsylvania, two tankers.

Delaware River—Chester, one cargo, one tanker.

Port Richmond, N. Y.—Staten Island, one cargo.

Camden, N. J.—New York, one collier.

Long Beach, California—Craig, one cargo.

Wilmington, Del.—Bethlehem-Harlan plant, one cargo.

—*Baltimore American*, 14/1.

PUTS SHIP OUTPUT AT 5,000,000 TONS.—To the statement of H. L. Ferguson before the Senate Commerce Committee that only 3,000,000 tons of shipping would be constructed in American yards this year, Edward N. Hurley, chairman of the Shipping Board, replied to-day with the assertion that the total output would be approximately 5,000,000 tons. In support of this a Lloyd's report was quoted, which put the capacity of American yards at from 4,500,000 tons to the 5,000,000 estimate of Mr. Hurley. Lloyd's, it was stated, did not take into consideration the plans for speeding up work in the yards.

Facts concerning the activities in shipyards, where government contracts are being handled, were presented. There are now 118 yards, which are 95 per cent completed, and in them are 716 ways, 416 for steel ships, and 300 for wooden ships. On December 22 there were 171,274 men employed in shipyards, as compared with 105,497 in October. It has been estimated that at least two wooden ships will be constructed on each way during the year and three to four steel ships. Plans are making to provide sufficient ways for all new construction possible with the materials obtainable.

Ship-builders are being urged to put on three shifts a day, and in some this program has been adopted. A campaign has been started to obtain sufficient men for the three shifts. At least 382,000 more workers will be required.

Charges that "Steel Trust" officials blocked a plan by which the government was to get steel for ship plates at one-third less than it is paying were made before the Senate committee to-day by L. P. Featherstone, president of the Texas Steel Company.

Featherstone proposed to sell to the government ore lands in Texas and coal properties in Alabama and erect a steel plant at Beaumont to make steel ship plates at about $45 a ton, as against $65 that other steel companies are charging the government. This plan, he said, was referred by the Shipping Board to the Council of National Defence and theince to a sub-committee on which were C. M. Schwab and other officials of large companies.

"They turned me down on the excuse that the government was not prepared to go into business for itself," said Featherstone. "I might not have expected anything different from the crowd of dollar-a-year men who were beneficiaries of high prices. There has not been an independent concern in the United States large enough to permit the government to be free from the men who control the steel output since Roosevelt surrendered to Frick and Gary and allowed them to take over the Tennessee Coal and Iron Company."—*N. Y. Times*, 11/1.

MERCHANT CAPTAINS WARNED.—Complaints that American merchant ship captains have not cooperated with commanders of convoys and with naval gun-crew commanders caused the Department of Commerce to issue instructions to-day to merchant officers to follow the directions of their naval associates in every instance where they are prompted by military necessity. Disobedience of the instructions, it is pointed out, will cause the withdrawal of merchant officers' licenses.

The instructions make clear, however, that in matters relating solely to navigation and to the discipline of crews the authority of merchant captains will be upheld.—*Baltimore Sun*, 20/12.

U. S. MERCHANT-MARINE PERSONNEL.—The great work for which the Shipping Board's recruiting service was created, the building up of an all-American personnel of officers and men for the new ships, has been going on since last June. It began with the training of officers at free schools in navigation and marine engineering at various ports on the Atlantic and Pacific coasts and the Great Lakes. At these schools about 600 men a term are being trained, the engineering term being one month, and the navigation

term about six weeks. On graduating, these students are sent to sea as reserve officers of the merchant marine, for further training, preliminary to their being licensed as mates or engineers.

By this method enough American officers have been trained in the past six months to keep pace with the demand arising from our increased merchant tonnage, not less than 3000 licenses having been issued in that time by the Steamboat-Inspection Service, which examines all candidates for licenses, under exacting requirements as to their experience and fitness. No man without proper sea experience can be licensed.

The supply of man-power from which these officers were drawn has by no means been exhausted. Our training schools for officers to-day are going on with their work with well-filled classes. We have navigation schools at Rockland and Portland, Me., at Cambridge, Mass., New York, Philadelphia, Baltimore, Newport News, and Norfolk, Jacksonville, Mobile, New Orleans and Galveston, San Diego, Los Angeles, San Francisco, Portland, Ore., and Tacoma and Bellingham, Wash.

We have free engineering schools at the Massachusetts Institute of Technology, Cambridge, the Stevens Institute, Hoboken, at Philadelphia, at Johns Hopkins University, Baltimore, at the Case School of Applied Science Cleveland, at Washington University, Seattle, and at Tulane University, New Orleans.

I submit that these facts are significant of our strength as a seagoing nation and of the virility of our new merchant marine.

The recruiting service of the Shipping Board is now engaged in an extension of its work to embrace the training of crews for our new ships, including seamen, firemen, oilers, water-tenders, cooks and stewards, in accordance with authority received from the board on December 7. On December 12 announcement of the board's training plan was made at Washington.

American seamen came forward at once to enter the new training service, not less than 500 applying at my office in the Boston Custom House in the first five days after the plan was announced, for service in what I may term the rank and file of the new merchant crews. The applications came from all parts of the country and from Americans in all walks of life. A considerable number of applicants gave evidence of education, and some stated they were college graduates. All counted it an honor to serve their country in its commercial fleets.

Our plan for preparing these men for service at sea is based on the best experience of our own and other maritime nations. It calls for the use of a squadron of training ships to take men to sea for intensive drilling in the duties of the mercantile mariner.

One ship already is in commission, another is being prepared for service, and steps are being taken to secure a third, for service in this squadron, which will have a home station at Boston. It is planned to extend this training service, if circumstances permit, to the Gulf and the Pacific Coast, with a training ship to be based on a port in each of these sections.

It is expected that six weeks of intensive drill at sea will fit a man of ordinary intelligence for duties as seaman, and a month for those of fireman. These are the two arms of the service in which there is the greatest need of capable men.

Careful thought was given to employing the most effective method of training, and it was decided that assigning a trained man of long experience to a squad of 10 men, and making him responsible for their satisfactory advancement, was the best method to pursue.

Students of the subject will recognize in this system a principle long advocated by friends of a strong national merchant marine, and successfully employed in the work of various states in training boys for the merchant service by the use of school ships, notably Massachusetts, New York and Pennsylvania. These school ships necessarily have had a limited output of graduates, and their system of training, though thorough, has been slow.

The Shipping Board's training ships expand the workable idea they represent, to meet a war emergency, and to lay the foundation of a greater merchant marine when peace returns.

None but citizens may enter the Shipping Board's training service, and the enthusiasm with which the actual work of training is being carried out seems to me to assure all-American crews for our new ships, such as have so long been the dream of all true friends of our merchant marine.—*Shipping*, 5/1.

SUGGESTIONS FOR SAFETY.—The Shipping Board has issued a booklet giving practical suggestions for traversing the war zone. The regulations cover the berthing of passengers, plugging shell holes, fastening bulkheads, tunnels, doors and other vital parts, and also the distributing of seamen's discharge books upon entering the danger zone. Passengers and seamen are warned to keep themselves warmly clothed and ready for any emergency. Copies of this publication can be had from the Government Printing Office, Washington, D. C.—*Marine Journal*, 29/12.

SHIPYARD EFFICIENCY.—In order to increase the shipyard worker's efficiency, men from the various steel ship-building plants are to undergo special training. They will be selected from different yards and undergo a period of six weeks' training. At the end of that time they will return to their respective yards and impart their knowledge to those engaged in construction work. The first class to undergo training will number about 200. The school will be held at the plant of the Newport News Ship-Building and Dry Dock Company, at Newport News, Va., which affords special facilities for training of this character. A reference to the *Nautical Gazette* of September 28, 1916, reveals the following interest displayed by that company for its operatives:

"Co-operating with the public schools and the Y. M. C. A., the company (Newport News Ship-Building and Dry Dock Company) has caused to be instituted in those buildings extensive evening school courses. All boys employed by this company are urged to attend one or more of these classes, due credit being given on the employment record for such attendance, and liberal rewards made for excellence of record. The courses embrace arithmetic, commercial arithmetic, algebra, geometry, physics, shop-sketching, plan-reading, mechanical drawing and a graded course in English. Work is also offered in English for foreigners and in elementary branches for colored boys and men."

With the foregoing as a basis one may expect good results from the new system of training.—*Nautical Gazette*, 15/11.

PERSONNEL

RETIRED NAVY OFFICERS RECALLED TO SERVICE.—The war has called back into active service nearly 500 retired officers of the navy, and 138 former officers who resigned in past years to enter civil life are now serving in the Fleet Naval Reserve.

There are 22 retired rear admirals, 18 commodores, and 34 captains on active duty, including many who have held important commands in the Spanish-American War, on service in Mexican waters, and in other operations of the navy. Seventy-nine retired commanders are in active service, 36 lieutenant commanders, 30 lieutenants, 25 lieutenants (junior grade), 28 ensigns, and many others in various other grades. One retired surgeon general, 3 medical inspectors, 6 medical directors, 8 surgeons, 5 passed assistant surgeons, and 4 assistant surgeons are on active service.

Former Secretary of the Navy Truman H. Newberry has been commissioned lieutenant commander, the highest temporary rank that could be given him under the law, and is now in command of the Neval Reserve Force of the Third District, New York.—*Official Bulletin*, 17/12.

MEN FOR FLYING CORPS.—Eight thousand men with special technical training are needed by the navy for the ground personnel of the Naval Flying Corps. Secretary Daniels has authorized the enlistment of this number, and recruiting officers have been directed to begin a drive to get the men.

There is an immediate need for mechanicians for naval aviation for the ratings of machinists' mates, carpenters' mates, quartermasters, coppersmiths and blacksmiths. These men will not be enlisted for pilot's duties, but will receive special training in the building, handling, repairing and overhauling of the navy's aircraft.—*N. Y. Herald*, 12/1.

THIRTY APPOINTED AS ASSISTANT CIVIL ENGINEERS IN THE NAVY.—Thirty candidates who passed a recent examination have been appointed to fill 10 vacancies and 20 temporary positions in the grade of assistant civil engineer, United States Navy. The strength of the Corps of Civil Engineers, formerly composed of 30 civil engineers and 36 assistant civil engineers, is now increased to 96.

The 233 candidates who took the preliminary examination represented 65 colleges, universities, and technical schools, coming from 37 states and from England, Canada, Russia, France, Switzerland, and the territory of Hawaii. Of this number, 80 passed the preliminary examination and were authorized to appear at Washington, D. C., for the final. Out of the 73 reporting, 23 failed to qualify physically, leaving 50 to compete in the written examination. Thirty of these, representing 19 colleges and coming from 12 states, qualified in this final test, and have been appointed assistant civil engineers with the rank of lieutenant (junior grade).—*Official Bulletin*, 14/1.

SIXTY NEW OFFICERS OF ENGINEERING CORP.—Some 60 new officers of the naval engineering corps arrived at the Naval Academy, January 8, for a month's intensive training along that and other military lines.

Admiral Eberle, Superintendent of the Naval Academy, who is their chief during the stay of these young officers there, made a short address to them upon their arrival.

Admiral Eberle outlined the best methods of acquiring instruction while the corps is in training at the Naval Academy, where they have come to receive this instruction, and gave the young officers some good, wholesome advice.

The new engineer corps, numbering 60 officers, is quartered in Section B, Temporary Quarters at the Naval Academy.—*Evening Gazette*, 11/1.

NEW NAVAL OFFICERS.—After not quite 15 weeks' intensive training in the practical side of naval officering, between 100 and 130 young junior lieutenants, who a few months ago left their civil vocations at the call of the government, were detached from the Naval Academy. The young officers, who come from all walks of life and almost all professions and trades, were sent immediately to ships and shore stations for immediate duty.—*Baltimore American*, 10/1.

WAR SPEEDS GRADUATION OF MIDSHIPMEN.—The present "first" class of midshipmen is to be graduated on June 6, 1918, from the Naval Academy, according to information received at Annapolis, December 29.

Ordinarily this class would not have completed its course until June, 1919, but it was advanced a year in the "speeding-up" program to provide officers for the service made necessary by expansion due to the war.

A class was graduated June 18 last and another last February.—*Washington Star*, 30/12.

NAVY OFFICERS WARNED.—In order that domestic affairs may not interfere with the attention of naval officers to their official duties, Secretary Daniels has forbidden officers establishing their families in the immediate vicinity of the ships on which they are serving. The prohibition is carried in a general order which says:

"The attention of all officers of the navy and marine corps is directed to the fact that, due to the very large number of vessels to be commissioned in the near future, and to the limited number of officers available, it becomes absolutely necessary for every officer to devote his entire time and attention to the preparation of every element of the fleet for meeting the enemy.

"In order that there may be no distraction from this duty, neither officers nor men should attempt to have their families in the immediate vicinity of the vessels upon which they are serving, particularly in the vicinity of fleet bases, and the department looks with decided disapproval upon such procedure."—*N. Y. Times*, 17/1.

INCREASE IN NUMBER OF MIDSHIPMEN AT ANNAPOLIS IS URGED.—Mr. Daniels, Secretary of the Navy, recommended to-day that Congress increase the number of midshipmen which each senator and representative may appoint to the Naval Academy from three to five. Special emphasis was placed on the need for more naval officers in a letter sent by Secretary Daniels to Speaker Clark. He said that these officers ought to be trained in Annapolis, "the school which Congress has provided and employed for training line officers."

In addition to allowing five appointments to each senator, representative and delegate in Congress, the bill submitted by Secretary Daniels provides for the appointment of 100 enlisted men to the Academy.—*N. Y. Herald*, 12/1.

MARINE CORPS INCREASE.—The latest unofficial estimates are that a marine corps of 75,000 men will be required within the next year to meet all naval needs and to maintain a division of marines in France. Naturally, the corps is waiting anxiously for Major General George Barnett to appear before the naval committees of Congress and explain just how many men are needed to meet the demands on the corps in all directions.

If the navy is given the increase of 78,000 men recommended by the Bureau of Navigation and if the marine corps is increased from its present 30,000 by only one-fifth of the navy increase, that would give a total marine corps of 45,600.

The marines aspire to increase their representation in France from a brigade to a complete division, including artillery and auxiliary troops. A corps of 45,600 would not be large enough to enable them to do this, if the needs of the navy for the services of marines also are to be met.

In view of the necessity of providing replacement troops for the marine forces that may be sent to and kept in France, it is a conservative estimate that a corps of some 75,000 men would be required to maintain a division in France and for the various organizations and detachments to meet the demands of the navy for advance-base service, yards, stations, ships, etc.

In view of the high opinion of the marine corps held in Congress, it will not be surprising if authority is given at this session for increase of the corps to 75,000 men. An increase especially is necessary, aside from the immediate needs, in order that the excellent training facilities of the corps, which have practically completed the work of bringing the present force to a high state of efficiency and are not now being used to capacity, may be further utilized.—*Washington Post*, 6/1.

NAVY LIKELY TO MAN ALL TRADE VESSELS.—The manning by the navy of all vessels belonging to the merchant marine of the United States, whether such vessels are used as transports, supply ships or cargo carriers, seems likely as a result of a conference held to-day at the Navy Department between Mr. Daniels, Secretary of the Navy, Edward N. Hurley, Chairman of the Shipping Board, and Andrew Furuseth, representing the Seamen's Union.

Little has been written, although much is known of conditions prevailing on virtually all of the ships manned by members of the Seamen's Union,

conditions which not only have retarded the operation of such vessels and delayed them in transit, but conduct by men of the crews which has seriously jeopardized the property of the United States and the lives of all on board such vessels.

The Navy Department has refused positively to operate vessels which are not manned exclusively by enlisted men. The Shipping Board is known to favor the manning of all vessels which are not under the control of the Navy Department with members of the Naval Reserve, but it is prevented from carrying this arrangement into effect by an agreement made several months ago with the Seamen's Union, which does not expire until next August.—*N. Y. Herald,* 28/12.

LESSONS OF THE WAR

THE APOTHEOSIS OF THE DESTROYER.—Only a few months before the war naval opinion was disposed to anticipate the early disappearance of the torpedo-boat destroyer. It was already looked upon as a nondescript type, which had outlived its usefulness, and was fated soon to be superseded by the swift submarine, just as the destroyer itself had superseded the torpedo-gunboat 20 years before. But this view has not been borne out by the experience of the war. On the contrary, for all-round utility the destroyer to-day probably holds the palm, and it is no secret that every one of the belligerent sea powers is turning out vessels of this type as rapidly as possible. Among the German boats reported as having been in action during the present year were several bearing numbers which, in the normal course of events, would have belonged to destroyers built under the 1919-1920 program, and there is other evidence to show that between 80 and 100 new boats have been added to the German fleet since 1914. So far as this country is concerned, statements made in Parliament by Admiralty representatives leave no doubt that destroyer construction has occupied, and still occupies, a leading place in our naval shipbuilding policy, and it will not have escaped attention that many new destroyer names, such as the *Mary Rose* and *Strongbow*—lost in the recent convoy attack in the North Sea—have been mentioned in the official communiqués. The Jutland battle dispatches also specified several destroyers which did not appear in the pre-war navy lists. The truth is that the destroyer bridges an important gap in the modern naval organization. It comes between the submarine and the light cruiser, and it has certain qualities which neither of these possess at present, nor are likely to possess in the near future. Compared with the submarine, it has the advantage of superior mobility, and, in certain circumstances, of greater offensive power. From the last-named quality arises, we believe, the fact that the number of submarines sunk by destroyer attack is considerably in excess of the number of destroyers lost through submarine attack. To heavier surface ships, such as battleships and cruisers, the submarine may be a more formidable menace than the destroyer, but that it is remains yet to be proved. Even so, however, the submarine menace itself has given the destroyer a new lease of life, for the heavy ships now rely mainly on the destroyer to defend them from underwater attack.

Taking the characteristics of the destroyers built by the principal naval powers immediately before the war, we find a certain similarity in the main features, which suggests the evolution of a universal design. There were notable exceptions, it is true, but the tendency on the whole was towards a uniform standard. The displacement averaged 1000 tons, the speed ranged from 29½ to 35 knots, and the armament generally included several guns of at least 4-inch caliber, besides torpedo tubes. In the minor details there was more divergence, especially in armament. The British practice was to strengthen artillery power, while the Germans appear to have laid more stress on the torpedo, and their latest pre-war boats carried six tubes, but only a couple of low-velocity guns. In the

United States an effort was made to combine both offensive elements in the highest degree, and the 1914 destroyers carry no less than 12 torpedo tubes, in addition to four 4-inch guns. The French boats of the *Bouclier* class, launched in 1910 and onward, represented something of a compromise both in displacement and armament, for the units of this class vary from 690 to 900 tons, and are equipped with two 4-inch and four 9-pounder guns, and four tubes. Some of them attained what were then regarded as extremely high speeds, the nameship of the class having made 35.4 knots on the measured mile. Italian constructors, following, as usual, a line of their own, built several remarkable vessels, which seemed to foreshadow the fusion of the destroyer with the light cruiser. From the *Indomito* class of 1911 they proceeded to the *Carlo Mirabello* group, jumping from 700 tons to 1500, but reducing the speed from 35 to 32 knots. All the later Italian boats were heavily armed, mounting at least one 4.7-inch gun, though the number of tubes rarely exceeded three. Russia had adopted the *Novik* as the model for all her new destroyers, and had 36 boats of this class under construction on the outbreak of war. The *Novik* was 338 feet in length, displaced 1260 tons, and with engines of 40,200 horsepower had developed the remarkable speed of 37.3 knots. Her armament consisted of four 4.1-inch Q. F., several lighter guns, and six torpedo tubes mounted in pairs. Judging by these details she was one of the most formidable destroyers in existence, and her large capacity for oil fuel gave her a very wide radius of action. Among the lesser powers Chili was foremost in developing the destroyer. In 1910 she ordered from British yards a group of boats which, although classified as destroyers, were in many respects more akin to light cruisers. They displaced 1430 tons, and had machinery intended to realize 32 knots. The armament consisted of six 4-inch guns, with three torpedo tubes. Both the exceptionally high freeboard and the roomy accommodation for the crew made them very seaworthy and habitable vessels, while the fuel capacity of 500 tons was sufficient for a cruise of several thousand miles. Thus in armament, sea-keeping qualities, and radius they were equal, if not superior, to the average third-class cruiser, and had the additional advantage of extremely high speed. Turbine machinery and oil fuel are the factors mainly responsible for the striking development of the destroyer type in recent years. Great displacement is no longer essential to the attainment of high velocity, nor does the maintenance of maximum speed entail any particular hardship on the firemen or engineers. The fact that displacement has increased is principally due to the desire to mount a more powerful armament and to obtain better nautical qualities. But it has been shown that all these desiderata may be comprised in a vessel of not more than 1000 tons, and when the records of the war become available, we shall probably find that a vast amount of useful work was performed by the destroyer of moderate tonnage. Vessels of this type have been largely used for patrol and convoy duty, in place of the more costly but equally vulnerable light cruiser, and they are simply invaluable for anti-submarine work. According to the American Naval Secretary, "they are the one thing that a submarine fears."

Without a detailed knowledge of all that has occurred at sea during the war, it is impossible to forecast with any certainty the lines of future naval development. But, with this reservation, we venture to assert that the destroyer is assured of a prominent place in the category of naval weapons for a good many years yet, more especially as, for the time being at least, it is the most effective antidote to the submarine. That underwater craft will steadily grow in efficiency is not to be doubted, but years must elapse before they can compete with the destroyer in speed and handiness, and until that happens the latter will retain its high tactical value both for ordinary patrol duty and as a means of protection against the submarine. The battle of Jutland showed, moreover, that the destroyer is still to be reckoned with as a potent weapon against the capital ship.

Throughout that engagement no ship on either side fell a victim to attack by submarines, but several German ships were sunk by destroyers. As the satellite of a battle squadron the destroyer is able to perform a variety of useful services. It can blind and confuse the enemy's gunners by throwing a pall of smoke over the target, it is ready at all times to beat off torpedo attack either from below or on the surface, or itself to dash in against the enemy's swiftly-moving line and assail him with torpedoes. The submarine as yet can do none of these things. Although exact figures are not available, we believe the modern destroyer costs no more than the modern submarine, but whereas the military value of the latter is very restricted, that of the destroyer is almost unlimited. As we have observed, therefore, the destroyer, so far from having outlived its usefulness, has established itself more firmly than ever as an indispensable unit of the naval organization, and seems certain to be perpetuated as a distinct type for a long time to come.—*Engineer*, 7/12.

MISCELLANEOUS NOTES

THREE LOST ON NAVY TUG.—Three men were fatally and a fourth seriously injured in the fuel-oil fire on a navy tug at an Atlantic port yesterday, the Navy Department announced tonight.—*Baltimore Sun*, 16/12.

CUSTOMS ON PARCELS TO NAVAL FORCE IN ENGLAND.—The British Board of Customs announces that gift parcels containing dutiable goods may be delivered free of duty when intended for officers and men of the United States Navy in the United Kingdom, provided they are for delivery on board ship in which addressee is serving. When intended for members of the United States Army in the United Kingdom, parcels should be addressed to regimental address of recipient; when intended for soldiers of American nationality in British or Canadian armies or for American medical officers serving in British military or base hospitals, parcels should be addressed in care of Committee for American Soldiers and Sailors of the American Red Cross, 154 New Bond Street, London, which committee will verify right of addressee to duty-free concession and arrange for delivery of parcels. Dutiable goods must be specifically described as tobacco, cigarettes, chocolate, etc. The foregoing relates solely to dutiable goods imported by parcels post.—*Shipping*, 22/12.

THE DREADNOUGHT "TEXAS" WINS GUNNERY LAURELS.—The dreadnought *Texas* established the highest record for gunnery practice last year, the Navy Department announced to-day, and will receive the Knox trophy, which is awarded annually to battleships scoring the highest number of points.

Captain Victor Blue, who commanded the *Texas* during the practice maneuvers, has been ordered to Boston to receive the trophy from the Sons of the American Revolution.—*N. Y. Herald*, 15/1.

UNITED STATES TO CONTROL MANILA HEMP.—The government has announced its intention to take action looking to the control of the purchase and distribution of manila hemp. It is expected in the next few days details of the plan will be announced.—*Official Bulletin*, 10/1.

SIX SEAMEN KILLED; THREE HURT.—Six men were killed and three injured on the U. S. S. *Michigan* when the ship was caught in a heavy gale at sea, it was officially announced to-day.

The men were killed and injured by the falling of a cage mast, the first accident of its kind in the navy.—*Evening Star*, 7/1.

WINTER CLOTHES.—Paymaster General McGowan furnished to the committee samples of winter clothing and boots and gave positive assurance that there was an ample supply of these articles on hand. Surgeon General Braisted told the committee that the average health conditions in the navy were better than the average health of men in civil life.—*Official Bulletin*, 12/1.

MEDALS OF HONOR.—Urge your member of Congress to vote favorably upon a resolution permitting American soldiers and sailors to receive from the allied governments medals of honor awarded them for their brave and splendid work in this war.

At least a dozen such medals awarded by the British Government to officers and seamen of the naval forces operating under Vice Admiral Sims are now being held by the State Department. But the Constitution of the United States forbids their accepting any medal or other recognition of service from a foreign government, except upon the express consent of Congress.

Obviously this is a time when Congress should grant such a permission. It does not, as a matter of international courtesy, harmonize with the relationship now existing between this government and the allied governments to refuse them the right to make appropriate acknowledgment of American services in the common cause.

The Navy League believes also that the government should make known the names and the deeds of these men cited for bravery by our Allies. As history is but the shadow of great men, patriotism is largely a reflection from the deeds of brave men. We need this inspiration of the acts of these men to give us the will to win.—*Sea Power*, January, 1918.

NAVY OIL BILL IN.—A bill prepared by the Navy Department to authorize the government to take possession either by contract, lease or otherwise, upon the issuance of an executive order, of all oil land set aside as naval reserves in California or Wyoming, was to-day introduced by Senator Swanson, of the Naval Committee.—*Baltimore American*, 12/1.

AMERICANS FINISH WORK ON HAYTI MILITARY ROAD.—The military road between Port au Prince and Cape Haitien, built by the *gendarmerie* under the direction of the American army of occupation, has been finishd.

Lieutenant Colonel Butler, commanding the United States Marine Corps, in charge of the work, made the first journey over the highway in an automobile at the head of a gay procession to-day.

The occasion was a holiday, the people highly appreciating the work undertaken by the Americans and thus successfully completed.—*N. Y. Herald*, 21/12.

PASSES BILL TO PROTECT MYSTERIOUS INVENTION.—The House bill for patent protection of "Garabed," a mysterious invention, said to be a source of limitless energy, was passed to-day by the Senate. It now goes to President Wilson. At the close of the last session the President gave the bill a docket veto. Garabed T. K. Giragossian, a Boston Armenian, is the inventor. He declined to reveal his secret fully until Congress protected it, and made such satisfactory explanations to the Patents Committee that they recommended passage of the bill.—*N. Y. Herald*, 17/1.

CURRENT NAVAL AND PROFESSIONAL PAPERS

UNITED STATES

WORLD'S WORK. **January.**—Must Panama Come to Sea Level? by *Philippe Bunau Varilla Lorraine*. The Test of Victory, by *J. B. W. Gardiner*.

CURRENT HISTORY. **January.**—Sinking a Battleship in Trieste Harbor, by *Percival Gibbon.*

FLYING. **December.**—Can History Tell Us How to Win a Decisive Battle? by *Rear Admiral Bradley A. Fiske.*

THE NAVY. **December.**—Pages from the Log of the Raider *Moewe* (extracts from the commander's diary), by *H. W. Hitchcock.*

AMERICAN JOURNAL OF INTERNATIONAL LAW. **October.**—Diplomatic Mission of the United States to Russia (Addresses by *Mr. Root* and the *Russian Foreign Minister*). A Unique International Problem (Spitzbergen), by *Robert Lansing.* An Economic War after the War, by *John Bates Clark.* Violation of Treaties, by *Denys P. Myers.* The American Attitude toward Captures at Sea, by *H. C. Quigley.* International Relations of Japan, China, and the United States (editorial), by *James Brown Scott.*

GREAT BRITAIN

FORTNIGHTLY REVIEW. **December.**—The American Embargo, by *James D. Whelpley.*

NINETEENTH CENTURY AND AFTER. **December.**—The Invasion of Italy and the Classic Strategy of Prussia, by *Sidney Low.* The Pacifist Peril, by *J. C. de Chassaigne.* The Story of the Declaration of Paris, by *Sir Francis Piggott.*

ITALY

REVISTA MARITTIMA. **September.**—Tactics and Naval Artillery in the Battle of Jutland, by *Captain Silvio Salza.*

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INTERNATIONAL NOTES

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NAVAL WAR NOTES

PREPARED BY

LIEUTENANT W. B. JUPP, U. S. Navy

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STRATEGY

ALLIED NAVAL COUNCIL FORMED.—Secretary Daniels has given out the following announcement, cabled by Admiral Benson, regarding the Allied Naval Conference held in Paris November 29 and 30, and the agreement to establish an allied naval council:

The conference held at the Ministry of Marine, at Paris, November 29 and 30, presided over by Monsieur Leygues, Minister of Marine, and the following delegates being present:

For France, M. Jules Cels, sous-secretaire d'Etat de la Marine; Vice Admiral De Bon, chief of the general staff.

For England, Sir Eric Geddes, First Lord of the Admiralty; Admiral Sir John Jellicoe, First Sea Lord.

For the United States, Admiral Benson, Director of the Bureau of Operations; Vice Admiral Sims, commanding the American naval forces in European waters.

For Italy, Vice Admiral Cusani Visconti, sous-chef d'Etat-major general.

For Japan, Rear Admiral Funakoshi.

The Naval Allied Council.—It has been decided to create a naval allied council in order to insure the closest touch and complete cooperation between the allied fleets. The task of the council will be to watch over the general conduct of the naval war and to insure coordination of effort at sea as well as the development of all scientific operations connected with the conduct of the war. The council will make all the necessary recommendations to enable the governments to make decisions. It will keep itself informed as to the execution of plans decided upon. The members of the council will report to their respective governments as may be necessary. The individual responsibility of the chiefs of staff, and of the commander-in-chief at sea, toward their governments as regards operations and, as well as the strategical and tactical disposition of the forces placed under their command, remains unchanged. It has been

decided that the council should consist of the ministers of marine of the nations represented and of the chiefs of naval staffs.

As the meetings of the council will of necessity be held in Europe the chiefs of the general naval staffs of the United States and Japan will be represented by flag officers nominated by their respective governments. The allied naval council will be provided with a permanent secretary, etc., whose business it will be to collect and collate all necessary information, etc. The council will meet as often as may be thought necessary under the presidency of the minister of marine of the country in which the meeting is held. The various admiralties will furnish the council with the information which is necessary for the work to be carried out.—*Official Bulletin*, 15/12.

WHY GERMANY DROVE AT ITALY.—A twofold object seems to have moved the Germans in their thrust upon Italy, one expressed and one concealed. The open reason given was the punishment of Italy for her defection from the Triple Alliance and as a demonstration of Teutonic might which should move us to seek peace. The unavowed object—which the censor carelessly allowed the Vienna correspondent of the *Frankfurter Zeitung* to let slip—was the heartening of Austria-Hungary, which, we are told, was anxious for peace at any price whatever. The *Frankfurter Zeitung* says:

"The recent victories on the Italian front have destroyed the hopes of Austrian advocates of peace at any price and the small party of pacifists in Hungary who are really working for the Entente. Nobody says any more that Austria-Hungary's war is really at an end. The population knows and feels it a matter of honor to return the military assistance rendered by Germany."

Turning to the "punishment" phase, we find the *Kölnische Zeitung* writing:

"German fists and German shells are up and at it, to wreak bitter vengeance for the wrong that has been suffered, while the Austro-Hungarian forces are paying out the wicked robber and teaching him not to stretch out his hand a second time after foreign peoples and foreign soil. The grievous sacrifices to which the two central powers have had to submit, and the augmentation of their troubles by the Italian desertion, justify the satisfaction which is to-day felt everywhere in German lands at the collapse of the Italian house of cards.

"Italy ought to have begun by building schools and teaching her people to read and write, in order to be able to guide them by the road of national culture and work to comfort and prosperity, instead of pursuing a windy *Machtpolitik*, and trying to enrich herself in bad company and by unworthy means."—*Literary Digest*, 15/12.

TRUTH ON WAR CONDITIONS.—*What America Must Do to Win World War.*—By Representative Tinkham.

1—Concentrate all possible efforts on the manufacture of a huge ocean tonnage.

2—Send wheat and corn to Italy to prevent revolution.

3—Contribute a large and splendidly equipped air service.

4—Send to American bases in France a greatly increased amount of general supplies.

The unvarnished truth was told to-day in the House by Representative George Holden Tinkham of Massachusetts, with the hope that it will awaken the War and Navy Department officials and the public generally to a realization that big action must be taken now to hold the world "safe for democracy."

In telling his opinions regarding what conditions are and what should be done at once to relieve them, Representative Tinkham said:

"It seems to be my duty to address the House upon my return from war-torn Europe and to submit to it some conclusions and impart information which I hope will be of some value.

"My information has been gathered from many sources—from personal observations and from conversations with men of various nationalities in military, naval, diplomatic, political and other employment.

"America wants the truth and it is vital that America have the truth. The picture of the military situation in Europe as reproduced in America is often not true, particularly in relation to America's military efforts there and the conditions in Germany. The truth in Europe, where America is to play her great and victorious part, is that to-day the central powers have achieved all of their greater military objectives, with the exception of the taking of Paris, the attempt to take Verdun being part of that purpose.

"Autocracy in Europe has democracy by the throat and is strangling it. The reasons for the success of autocracy are that autocracy is organized, deals more in deeds than in rhetoric, and modern autocracies are masculine and not feminine. Democracy to be successful in this the greatest struggle in arms of all times must organize better than autocracy, drop rhetoric for deeds and become masculine.

Conditions in France and England.—"I found the French soldiers and people courageous and unwavering in their dauntless loyalty. There is no avoiding the truth, however, that France is war-worn and has passed her meridian in man power and effort. She has plenty of food, with the exception of wheat and sugar. She has excellent military and political leadership.

"I found England's war efforts splendidly organized and her equipment complete. The English army is cheerful and confident. Large losses, such as 200,000 men in the last two months, I have heard criticized as unnecessary. The truth, however, is that England is at the height of her power, but it is a height which she can maintain, undoubtedly for one or more years. Under these circumstances, after three years of fighting, it seems impossible for France and England to obtain a military decision, and France and England frankly admit the absolute necessity of a colossal effort on the part of America.

"Much evidence shows that, although Germany is very short of food, she is not starving, and that the food situation in Germany is not as bad in some essential particulars as it was a year ago. There is also much evidence that Germany to-day has a larger number of men under arms than at any other time during the war, although their quality is not as good as formerly. The real social and political conditions in Germany are not much known, but it is not thought that there will be a revolution until after the war.

"The results in France of American efforts up to the first of December, in a strictly military way, have been practically negligible. The number of men there is much smaller than the American public believes; and although food and clothing were good in amount and quality, the lack of general supplies has a most demoralizing effect upon all preparations and efforts. I am not speaking of American artillery, aeroplanes, machine guns and ammunition, about which the American public now knows, but of such supplies as auto trucks, machinery, tools, wood, nails, camp kitchens and many other absolutely essential things.

"I saw some of the finest trees in France being cut for lumber. Modern war cannot be carried on without lumber in large amounts, yet there was not sufficient lumber to be used by the French and English troops in France. It is my fixed opinion that the sending of more American troops without adequate general supplies will be a disastrous blunder.

"The situation in Italy on the economic side is very perilous. All of the people north of Rome live on wheat and corn meal, and on the 1st of December there were only three months' supplies on hand. Unless America

is able to supply wheat and corn meal to Italy in sufficient quantities before it is too late a revolution such as occurred in Russia will not be unlikely.

"The submarine situation is much more acute than the people are allowed to believe. The total allied tonnage sunk per month which is not totaled for publication exceeds the new tonnage launched, and this has been so for many months, and will exceed the new tonnage launched until July 1, even if the plans of the allied governments are all carried through successfully. The Mediterranean is practically controlled by the submarines and the number of submarines and their efficiency seem to be increasing, although the American and British efforts against the submarines have been crowned with much success.

One Supreme Commander Needed.—"It is thought by those best informed on military matters that a supreme commander of all military efforts of the Allies should be chosen and given full power and authority.

"The best informed men in France and England believe a decisive military decision cannot be reached before 1919 or 1920, when America will be able to contribute her real military strength.

A War of Transportation.—"The war for America is a war of transportation, and America should concentrate all possible effort on the manufacture of a huge ocean tonnage. Wheat and corn should be immediately sent to Italy to prevent a revolution; America should contribute a large and splendidly equipped air service, and America should at once send to American bases in France a very much increased amount of general supplies.

"The winning of the war rests completely in the hands of America, in her forests, her furnaces, her farms, her men, her energy and her will. This war, cost what it may, in blood or treasure, strength and sacrifice, must be won for America's honor and America's future."—*Washington Evening Star,* 17/1.

THE INERTIA OF MODERN WAR.—The inexorable law of inertia, operating on the vast machinery of this war, forbids a decisive victory between armies that are equal, or even approximately equal, in numbers, munitionment, morale and leadership. A dozen battles have been fought since August, 1914, all of which were greater than any recorded in history, and any one of which would have been absolutely decisive in any era but our own.

Nobody seems to have foreseen this—not even the nation which for 40 years past has dreamed of war conquests, and made the military subjugation of other races the great goal of its national life. For we find in a book on the lessons of the war recently written by a distinguished German general, the astonishing confession that no absolutely decisive battle can be fought between equal and well-entrenched national armies, such as those now confronting each other on the western front.

Although this writer does not give us the reasons for his belief, they are not far to seek. It is the law of inertia applied to the enormous mass of a modern army that has pinned it fast, and put a heavy discount upon such shrewd, elastic and ever-daring strategy as that of the great Napoleon, and such lightning-like tactics as those of the veteran army that fought under him.

This is a war of artillery—heavy, semi-mobile artillery. In Napoleon's day artillery (light field artillery), was an adjunct of the infantry; to-day infantry is an adjunct of the artillery. The heavy artillery (6-inch to 12-inch) obliterates the enemy's defences; this done, the infantry takes possession. No further advance can be made until the inertia of the huge mass of guns, shells, ammunition dumps, railroad yards, tracks, machine shops, etc., has been laboriously overcome by ceaseless, herculean pressure, exerted for days, weeks and months. Finally when the full momentum has been attained it is expressed in days of "hurricane" bom-

bardments. Then the infantry can go forward—and they must only go so far.

Woe to that army which disregards this law of inertia. The British forgot or disregarded it at Cambrai. They moved far beyond the protecting arm of their heavy artillery—and paid the price. Not until they swung back within its shelter could they stand. When the tanks swept through the Hindenburg line, it looked as though a modern line could be permanently broken. So on they went, "horse, foot, and artillery," leaving the heavy stuff to come on at its leisure.

The British heavy artillery will ultimately take Cambrai and the infantry will consolidate and hold the position; but we think this recent venture will be the last attempt to introduce on the western front the open fighting of earlier wars. It simply cannot be done.

It is a curious paradox that a preponderance of heavy artillery at once makes victory possible and a decision impossible. It was an enormous preponderance of heavy artillery that enabled the Germans to break through the Russian lines at the Dunajec. It was the inertia of this artillery that prevented the victors from splitting up, encircling and capturing the Russian Armies—and so rendered the result indecisive.

The war will be won by the decimation of the German Armies *in situ*, by the allied preponderance of artillery. Even though they seek to save their diminishing man-power by remaining on the defensive—they must hold their lines, and in so doing must be subject to an overwhelming shell-fire attack from which there is no escape.

We can make no more important contribution to the allied cause than to mobilize every possible forge, factory and machine shop for turning out artillery of heavy caliber.—*Scientific American*, 29/12.

GERMANY PLANS AERIAL WARFARE ON GREAT SCALE TO MEET U. S. FLIERS.—With the American Army in France, Friday, January 4.—Germany's plan for aerial warfare on a larger scale than heretofore, it is indicated in documents taken from enemy prisoners, are founded upon published statements regarding the aerial warfare plans of the United States. Information to this effect has reached the American expeditionary forces.

It is indicated that the Germans, believing that America intended putting machines by the tens of thousands into the battle arena, immediately enlarged their own plans in the expectations of offsetting the increased enemy forces. Just when the enemy's program will be realized is uncertain, but the information obtained in captured documents is regarded by ranking officers as making it extremely desirable for a speedy and complete development of American air service.

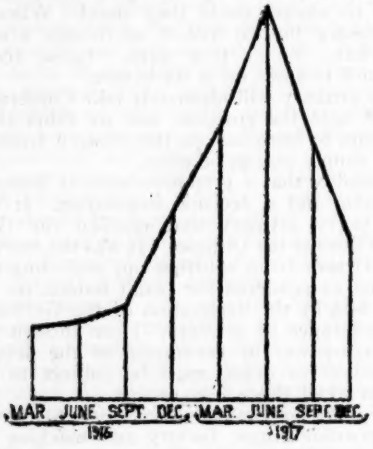
In cooperation with the Red Cross, Y. M. C. A. headquarters is busy completing arrangements for other centers than Paris; here the personnel of the American expeditionary forces can go when they are given leaves and have clean and healthy amusements such as movies, baseball, football, mountain climbing and other sports. It is hoped that these centers will prove substitutes for Paris, as permits to spend leave there have been suspended to all officers and men in the interests of temperance and morality.—*Washington Post*, 6/1.

EXPLAINS U-BOAT WAR.—The British Admiralty, on December 20, sent a statement to the press elucidating some remarks made in the House of Commons a week before by the First Lord, Sir Eric Geddes, on the losses suffered in the U-boat campaign by the merchant marine of the Allies and neutrals, together with the losses inflicted on Teutonic submarines. Sir Eric had said:

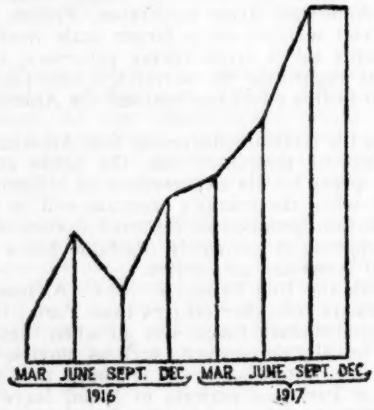
1. The demands on our merchant shipping are greater than ever.
2. The submarine menace is held, but not yet mastered.
3. Our shipbuilding is not yet replacing our losses.

4. I deprecate the drawing of deductions from the experience of any one week or month, be it good or bad. It is upon the general curve of all the factors that we must base our conclusions.

5. The downward trend of mercantile marine losses, both of ourselves and our allies, has continued satisfactory since I last spoke on November 1.



QUARTER ENDED. LOSSES OF MERCHANT TONNAGE.



QUARTER ENDED. GERMAN SUBMARINES SUNK.

6. The upward curve of merchant shipbuilding has also continued satisfactorily, and this curve will undoubtedly be maintained in an upward direction.

7. The upward curve of the destruction of enemy submarines has continued equally satisfactorily.

Subsequently Washington announced that the average rate of destruction of U-boats was 1.25 a day, or about 38 a month, while the German rate of construction was .75 a day, or about 23 a month. The statement of the British Admiralty with the diagrams above which accompanied it follows:

"In view of the statement made by the First Lord in the House of Commons on Thursday, the 13th inst., that the general curves of merchant tonnage sunk by enemy action and of German submarines sunk are satisfactory, it has been thought that the public would be interested to see these curves, and they are placed at the disposal of the press accordingly.

"With regard to the upper diagram, the height of the enemy submarine attack upon merchantmen was in April, 1917, and that accounts for the quarter ended June showing the 'peak,' since when the curve has steadily fallen, and in the last quarter of this year has reached the same figure as in the last quarter of 1916, which was before the unrestricted submarine attack began.

"The lower diagram shows that since the quarter ended September, 1916, there has been a steady rise in the number of submarines sunk, and although for the last quarter of 1917 the number sunk has not further risen, it must be remembered that there are still the results of half a month to add, and we have already equaled the results of the quarter ended September, 1917.

"Attention is particularly drawn to the notes at the foot of the diagrams, which explain that they are statistically accurate and drawn to scale, but that obviously the scale is not the same in both, the upper being for tonnage of merchant vessels and the lower for the number of submarines."

—*N. Y. Times*, 15/1.

U-BOATS PREYING ONLY ON SLOW SHIPS.—Commander Bellairs was recently quoted as saying in the House of Commons that, according to American figures, of merchant ships of under 9 knots, 90 to 100 per cent were sunk by submarines; of 9 and 10 knots, 70 per cent; 12 knots, 50 per cent; 18 knots and above, none. The *Lusitania* was the only vessel of high speed sunk. Supplementing this information, the British Admiralty reports that of the British tonnage actually sunk in September and October, about one-eighth only consisted of ships carrying food, over one-third of ships carrying coal, and the remainder of ships carrying miscellaneous commodities, or ships sailing outwards in ballast. It would appear from this that only the slow-moving cargo boats are succumbing to U-boat attacks.—*Nautical Gazette*, 3/1.

TRUE STATE OF GERMANY.—From the victory of the Allies at the Marne, that witnessed the first close cooperation of the British and the French in numbers, to the present time the outcome of the war has been a settled conclusion. That victory that absolutely shattered the cardinal point of German strategy, namely, to reach Paris in 30 days by way of devastated Belgium, will stand out in history as marking the turn of the tide against the Germans. They staked all on one throw after it was seen that England could not be prevailed upon to permit France to be throttled. And that cast was against them. Since then the war from the German side has been a stupendous effort to stave off the day for the Allies by piling up an unthinkable war equipment and marshaling the nation itself to arms. And every day the grim, cold and unsentimental British blockade has been strangling the German nation. Never for a moment has England made a distinction between the German Government and people such as was important for the United States to make in the interest of democratization of the German Empire. And the German people have felt the squeeze until their tongues literally are out and they are ravenous for food and rabid for peace.

All the while the hard ring of French and British artillery has become harder and harder. Penned in behind the lines, that are the real lines of invincibility and not those of Hindenburg, the Germans have scurried from point to point. They could not break the iron ring of France and England. They were more successful with that of Russia through chicanery and deceit, through fraud and corruption. And that is the reason

why the British premier, Lloyd George, in his address laid at the door of Russia its blood-guiltiness and declared that the Russians must work out their own destiny.

England has suffered in multi-thousands of killed. France has suffered to the point of critical sacrifice because of the defection of Russia. Not the Russia of Kerensky, but the Russia of the Bolsheviki, the radical overthrowers of all organized society in the name of liberty. As the best exponents of liberty Russia has now to offer, the United States must look beyond them to Russia itself. It, therefore, has no antagonisms but friendships to proffer. It does not, it will not and it cannot regard the Bolsheviki as presenting the best program of democracy for Russia, not to say the world. The crude internationalism of the latter has saving features that in time will find incorporation in the general democratic program for all free peoples.

The Germans turned to their submarines for the victory they found themselves unable to achieve on land. Having sought to carry the war into Egypt and to seize the Seuz Canal and to split the British Empire, and failed, they turned back to the sea. Beaten in the west, beaten in the east, reaping some harvest of success from the Russian defection, but a veritable Pandora's box of ills as well, they see even the submarine failing them. The one tragical fruitage of the submarine warfare for Germany was the entrance of the United States into the strife. And from that hour the doom of the submarine warfare was sealed.

What has Germany left to which to turn? It has still resources open to it of making a break with its fleet. But its foes have multiplied their sea power, already overwhelming, while Germany has been so bent upon building the submarines that have counted nothing for it in the outcome, as to be unable to carry on a considerable program for ships of the major orders. A dash with the fleet would be a dash to death. There remains now only the much talked of proposed gigantic west-side offensive. This may occur. But it will not occur before spring or summer, and then it will be a supreme act of national suicide. Between now and spring the gullet of the Germans—and who that is human does not have pity for the deluded or guileless of them who clamor for bread and are given a stone—will be well nigh closed. The true case for Germany is marked by the true state of Germany. It is a state of awakening from illusions, of abject and gnawing want and hunger, of revolt against the servility that has marked the German through this training for generations. The soul of free Germany is being born in the agonies of unparalleled suffering and the militarists cannot stifle this soul at its birth by their rapacious and inhuman calls for blood, for more blood, for reckless, wasteful shedding of blood—to no purpose!—*Baltimore American*, 12/1.

U-BOAT OPERATIONS.—In the present war, submarines have been employed for the first time as commerce destroyers. As such, they have proved themselves far more effective than warships, which can only traverse the surface of the seas. According to Captain Persius, the well-known German naval authority, the cruiser *Karlsruhe*, during her short-lived career, inflicted more damage on Entente shipping than any of the other German surface raiders. This vanished unit of the Kaiser's navy destroyed 17 vessels in all, representing 76,609 tons. Next in record to the *Karlsruhe* comes the cruiser *Emden*, which, in her spectacular cruise, sank 17 vessels of an aggregate tonnage of 73,895 tons. On her first raiding expedition, the *Moewe* bagged 15 ships, with a total tonnage of 57,746 tons.

These achievements of the German surface cruisers appear comparatively insignificant, however, alongside the toll taken by individual U-boats. At the head of the list stands the one commanded by Lieut. Commander Valentiner, which, according to German reports, was responsible for the destruction of 128 vessels, with an aggregate tonnage of 282,000 tons.

Estimated on a conservative basis, the value of these ships, with their cargoes, was probably not far from seventy millions of dollars. A close second is the submarine of which Captain Arnauld de la Pière was commander, with a record of 126 ships and 270,000 tons sunk. In case Germany's ruthless submarine campaign should be continued in the future with the same unabated vigor as in the past, it is possible that even these figures may be surpassed hereafter.—*Nautical Gazette*, 20/12.

ATLANTIC

TWO ON "JACOB JONES" TAKEN PRISONERS.—Two sailors were saved by the Germans from the American destroyer *Jacob Jones*, according to an official German announcement received December 18.

The *Jacob Jones* was torpedoed and sunk in the war zone on December 6 and 65 men on board were listed as missing. Survivors reported that one American who spoke German was taken away a prisoner on the submarine.—*Baltimore Sun*, 18/12.

LINER SINKS U-BOAT.—A German submarine was sunk by the fire of guns of an American passenger steamer approaching the British coast December 27, according to reports of the passengers and gunners aboard.—*Baltimore Sun*, 29/12.

UNITED STATES SUBMARINE "F-1" RAMMED AND SUNK BY THE "F-3" IN HOME WATERS.—Secretary Daniels authorizes the following:

The United States submarine *F-1* was rammed and sunk by the United States submarine *F-3* in a fog in home waters. The *F-3* was not injured and returned to port with five survivors of the lost vessel. Nineteen of the crew of the *F-1* are missing.—*Official Bulletin*, 19/12.

REPORT MYSTERIOUS GERMAN VESSEL OFF BRAZILIAN COAST.—Brazilian newspapers received December 27, are filled with accounts of the movements of a German corsair off the Brazilian coast a few weeks ago. The newspapers assert that the mysterious vessel was identified as a German, and that she unloaded an immense cargo of heavy cases at Cerqueira and Armacao.

Several days later the vessel returned to Armacao with additional cargo, which the newspaper accounts say it is believed she received from a larger ship out of sight of land. From Armacao the vessel proceeded to Calouro, where another portion of the cargo was unloaded.

These ports are not guarded, and it is asserted that the cargoes landed were mysteriously smuggled away. Later the German vessel was sighted close to shore at San Pedro de Aldera, where two persons are now under arrest as a result of their relations with the crew. They are accused of being spies.

The newspapers say the corsair disappeared as mysteriously as she came and that the Brazilians believe she brought supplies for a submarine base.—*N. Y. Herald*, 20/12.

DETAILS OF FOUR-HOUR SEA BATTLE WITH U-BOAT AS REPORTED BY THE "LUCKENBACH'S" COMMANDER.—A detailed account of the four-hour battle with the German submarine which attacked the American steamer *J. L. Luckenbach* on October 19 is given in the report made to the Navy Department by the commander of the armed guard on that vessel, which, though hit several times by shells, reached port safely.

At 7.30 a. m. the after lookout on the *Luckenbach* reported a steamer abeam. The commander of the armed guard sighted her himself about one point forward of the port beam. Upon looking at the steamer, which appeared very suspicious, through the glasses, a sail appeared on her. Both guns were trained on the steamer. The armed guard commander

then went aloft to obtain a better view. When he was halfway up the supposed steamer turned out to be a submarine and opened fire.

The *Luckenbach* immediately opened fire with both guns. The first two or three shots fired by the submarine fell about 2000 yards short. She was firing at long range. The *Luckenbach's* shots also fell short. As the submarine appeared to be closing in, the captain was told to put the stern of the *Luckenbach* to her, which he did. Distress signals were sent out by wireless.

The submarine closed in to about 2000 yards. Early in the battle one shot from the submarine landed on the deck forward on the port side and exploded in the gun crew's quarters, starting a fire which partially destroyed the quarters and burned the effects of the gun crews. The same shot burst the fire main. The fire main was blocked off and water finally got to the fire. Steam was also turned on the flames. Shortly after the first shot landed another shot struck the quartermaster's room, without doing much damage.

A shot landed near the stern and exploded, putting the after gun out of commission.

"At least 225 rounds were fired by the submarine, out of which there were only nine clean hits," the commander reports. "Pieces of shell were falling all around the deck. Two shots landed on the port side forward, striking the oilers' room and putting a large hole in the side; one landed on the port side at the water line, hitting the fresh-water tank and destroying most of the fresh-water supply. Another landed in the petty officers' mess room and exploded, putting the ash hoist out of commission and bursting the steam pipe, also wounding two men, one mess boy, and one fireman. One shot passed through the weather screen on the bridge and landed in the cargo, exploding but not starting a fire. Pieces of shell hit V. Louther, one of the armed guard, in three places. One of the ship's crew, who was carrying ammunition forward, was hit. Another shell exploded in the engine room, wounding the first and third engineers and putting the engine out of commission. Bell, one of the gun's crew, was going up the forward ladder carrying ammunition when the shell that landed in the quartermaster's room exploded, the fumes from the shell blinding him for about two hours."

"Never Surrender!" Flashed by Radio.—The distress calls sent out had been answered by a United States destroyer at 8.10, which was asked how quickly it could arrive at the scene. "Two hours," was the reply. The captain of the *Luckenbach* said: "Too late. Look for boats." "Don't surrender," came back the message, and the *Luckenbach* replied: "Never."

At about 11 a. m. smoke was sighted on the horizon. The vessel was headed toward the smoke to lessen the distance the destroyer would have to come. It was shortly after this that the engines were temporarily put out of commission by an explosive shell. At about 11.30 the destroyer fired her first shot at the submarine, which submerged 10 minutes later.

The *Luckenbach* had commenced firing about 7.40 and ceased firing at 11.40, 202 rounds being fired at the submarine.

"The ship's crew behaved creditably, no trouble being experienced in getting them to pass ammunition," the commander of the armed guard reports. "The firemen stayed below. Great praise is due the armed guard for the manner in which they performed their duty. The men stationed at the guns never flinched. When the after gun was put out of commission the after pointers came to the forward gun and relieved one another, as 167 rounds were fired out of the forward gun. H. Bolges, chief boatswain's mate, was a great help, doing most of the spotting from the top of the wheelhouse while the armed guard commander was taking care of things around the decks and guns."

The destroyer stood by until the engines were repaired, which took about two hours and a half, and then escorted the *Luckenbach* to a convoy, which was reached about 5 p. m.

All the members of the armed guard on the *Luckenbach* have been commended by the Navy Department for gallantry and devotion to duty, and the commander of the guard has been promoted, being given a temporary warrant as boatswain.—*Official Bulletin*, 14/1.

DESCRIPTION OF SINKING OF GERMAN U-BOAT AND CAPTURE OF ITS CREW BY TWO AMERICAN DESTROYERS.—Secretary Daniels to-day made public further details, given in reports of officers, of the destruction of a German submarine and the capture of the crew by American destroyers in November. The capture was made by the U. S. S. *Fanning*, assisted by the U. S. S. *Nicholson*. The *Fanning* was commanded by Lieutenant A. S. Carpender, Lieutenant G. H. Fort being the executive officer.

About 4.10 p. m., while escorting a convoy, the lookout of the *Fanning*, Coxswain David D. Loomis, sighted a small periscope about a foot above water some distance off the port bow. The periscope was visible for only a few seconds. The destroyer immediately headed for the spot and three minutes after the periscope had been sighted dropped a depth charge. The *Nicholson* also speeded to the position of the submarine, which appeared to be headed toward a merchant vessel in the convoy, and dropped another depth charge. At that moment the conning tower of the U-boat came to the surface between the *Nicholson* and the convoy. The *Nicholson* fired three shots from her stern gun. The bow of the submarine came up rapidly. She was down by the stern, but righted herself and seemed to increase her speed. As the *Nicholson* cleared, the *Fanning* headed for the U-boat, firing from the bow gun. After the third shot the crew of the submarine all came on deck and held up their hands, the submarine surrendering at 4.28 p. m.

The *Fanning* approached the submarine to pick up the prisoners, both destroyers keeping their batteries trained on the boat. A line was got to the submarine, but in a few minutes she sank; the line was let go and the crew of the U-boat jumped into the water and swam to the *Fanning*.

Although the crew all wore life preservers, a number of them were exhausted when they reached the side of the destroyer. As the submarine sank, five or six men were caught by the radio aerial and carried below the surface before they disentangled themselves. Ten of the men were so weak that lines had to be passed under their arms to haul them aboard. One man was in such a condition that he could not even hold the line thrown him. Chief Pharmacist's Mate Elzer Harwell and Coxswain Francis G. Connor (N. N. V.), jumped overboard after this man and secured a line under his arms. When he was hauled aboard every effort was made to resuscitate him, but he died in a few minutes. The four officers of the submarine and the 35 members of the crew were all taken prisoners.

After being taken on board the prisoners were given hot coffee and sandwiches. Though kept under strict guard, they seemed contented and after a short time commenced to sing. To make them comfortable the crew of the destroyer gave them their warm coats and heavy clothing.

The German officers said the first depth charge had wrecked the machinery of the submarine and caused her to sink to a considerable depth.

The submarine bore no number nor distinguishing marks. She was identified by life belts and by statements of an officer and men of the crew. One of the life belts had "Kaiser" marked on one side and "Gott" on the other.

The *Fanning* proceeded to port and transferred her prisoners under guard. As they were leaving in small boats, the Germans gave three cheers. The commanding officer of the *Fanning* read the burial service over the body of the dead German sailor, and the destroyer proceeded to sea and buried him with full military honors.

The commander of the *Fanning* reports that the conduct of all his officers and crew was excellent.

The British commander-in-chief, under whom the destroyers were operating, in a report to the British Admiralty, said: "The whole affair reflects credit on the discipline and training of the United States' flotilla," and added that the incident showed that the *Fanning* "is a man-of-war in the best sense of the term, well disciplined and organized and ready for immediate action." He concludes that the credit for this must be given her commander. He mentions as worthy of particular commendation Lieutenant Henry, deck officer of the *Fanning*, the coxswain who sighted the periscope, and the chief pharmacist's mate and coxswain who jumped overboard to rescue the drowning German.

The British admiral also commends the prompt action of the *Nicholson*, which completed the success of its sister ship.

The British Admiralty sent a telegram to the commander-in-chief directing him to express to the commanding officer, officers, and men of the *Fanning*, its "high appreciation of their successful action against enemy submarine."

Vice Admiral Sims, commander of the American forces operating in European waters, issued an order commending the officers and men of the *Fanning* and *Nicholson*. Coxswain Loomis was advanced to the next higher rating in recognition of his vigilance in sighting the periscope.—*Official Bulletin*, 31/12.

EXTENSION OF SUBMARINE ZONE.—Germany has extended her submarine zone to include the waters around the Cape Verde Islands, Madeira and a portion of those of French Senegal, all off the northwest coast of Africa. Through these waters lay important trade routes from the Pacific and Indian Oceans, South Africa and South America to Europe.—*Baltimore American*, 10/1.

HONORED FOR SINKING AMERICAN DESTROYER.—Emperor William has conferred the Order Pour le Merite on a submarine commander, Kophamel, on his return from a cruise to the Cape Verde Islands. During this cruise, Kophamel asserts, he sank an American destroyer and 14 merchantmen, most of them bound from the United States for Italy or France. He is said to have brought back 22 tons of copper as booty.—*N. Y. Herald*, 10/1.

DEPTH CHARGES ARE SMASHING U-BOATS.—"One of our submarines shot a heavily-laden steamer of 5000 tons out of a convoy. A violent enemy counter-attack followed.

"The destroyers left the convoy and followed the submarine and in the course of a few minutes dropped 39 water bombs around the spot where the U-boat was supposed to be submerged. Luckily they failed to hit her and our U-boat escaped unscathed.

"The same submarine was previously followed by two airplanes from midday until evening and pelted with 23 bombs but escaped."

The same newspaper contains an account of a submarine cruiser which had a narrow escape from destruction in the explosion of a munition ship which she torpedoed from too close a range. The steamer, runs the account, blew up, "with a terrific detonation, wrapped in a column of flame, and the next second the flames disappeared and the steamer was gone."

The force of the explosion upset the submarine's steering apparatus and did other damage, but the crew finally succeeded in effecting repairs so that the U-boat managed to get into port.—*Baltimore American*, 16/1.

SUBMARINE IN SOUTH ATLANTIC.—On December 9 there was a rumor in Buenos Aires that a German submarine had been seen in the Atlantic, somewhere off Rio. On the following day the Spanish Premier made an official announcement that the Spanish steamer *Claudio*, bound from America for Spain, had been bombarded by a German submarine. On

December 14 a Lisbon cable stated that Funchal, Madeira, which is on the route from the English Channel to the Cape Verde Islands, was bombarded by a German submarine, 40 shells having been fired and a number of persons injured.

Some of these incidents may have been identified with the submarine that was commanded by Commander Kophamel.—*New York Times*, 6/1.

SUBMARINE SIGHTED IN GULF OF MEXICO.—Guards have been stationed at all coast artillery batteries here to-day and a close watch is being kept on all shipping following wireless reports that a submarine had been sighted by two American patrol boats 100 miles south of the Galveston Bar.

Military authorities declined to discuss the report further than to admit such a report had been received.

All coast artillery troops absent on leave were immediately summoned to man batteries.

The report received said that the submarine mounted two guns and that it submerged and was not seen again when the American patrol boats gave chase.

Navy Has No News.—Washington, January 14.—The Navy Department was without information to-day of the hostile submarine reported seen in the Gulf of Mexico.—*Baltimore American*, 14/1.

AMERICAN TRAWLER LOST.—Washington, January 14.—An American trawler operating in European waters has been lost by striking a rock. Admiral Sims reported the sinking of the little vessel to the Navy Department to-day. All members of the crew were saved.—*Baltimore American*, 15/1.

FOURTH LUCKENBACH STEAMER TORPEDOED.—New York, January 7.—The American steamship *Harry Luckenbach* has been torpedoed and sunk with loss of life, according to word received by the owners of the vessel to-day.

Eight of the crew are missing, the owners were informed. The crew consisted of 30 men, not including the naval guard.

When last heard from by the owners the *Harry Luckenbach* was in France, having been requisitioned at a French port October 15 by General Pershing for use as a supply ship of the United States Shipping Board. It is believed she was sunk in the English Channel.

The vessel was in command of Captain F. S. Jones. No information as to the identity of the eight men reported missing has been received.

The *Harry Luckenbach* was built in 1881 at West Hartelpool, Eng., under the name of the *Surrey*, and was also known as the *Michigan* before her purchase by the Luckenbach Steamship line. She was registered at 2798 tons gross.

The *Harry Luckenbach* is the fourth ship of the Luckenbach line lost through submarine attack since the war began. The others were the *Jacob Luckenbach*, sunk July 7, 1916; the *Lewis Luckenbach*, October 14, and the *D. N. Luckenbach*, October 27 last year. Five members of the crew of the latter were killed. Another ship of the same line, the *J. L. Luckenbach*, had a four-hour running fight with a submarine the same month but escaped, although a number of her crew were killed by shellfire. The total gross tonnage of the four ships sunk is 12,508.—*Baltimore American*, 9/1.

"COME AND GET ME"; NIGHTLY TAUNT TO U. S. DESTROYERS.—Commanders and crews of the American destroyers operating in European waters are talking about a grim piece of Hun humor. Nearly every night the commander of one of the destroyers receives by wireless a message reading:

"My position is (so many) degrees north and (so many) degrees west. Come and get me. I'm waiting for you." The message is always signed Hans Rose.

Rose is the German who took a submarine into Newport two years ago, welcomed society aboard his craft and then went out and sank several steamships almost within shooting distance of Nantucket. According to the story passed around by the men engaged in the thrilling and hazardous task of seeking submarines, the captain to whom is directed the nightly messages of the German subsea craft sank two. The commanders of both were intimate friends of Rose. He has sworn vengeance. Not only does he send his taunting message to the man he has never seen, but he goads him further by flashing a message defining the position of the destroyer.

It is disquieting for the American commander, but he has no fears. Twice, it is stated, he has swiftly guided his craft to the location described by his enemy, but has found nothing and seen nothing. Still the mysterious wireless dispatch comes every night, no matter where the destroyer may be. Others catch it, and thus the weird story is told wherever the hornets of the sea are seen.—*N. Y. Herald*, 17/1.

BAGLEY RECORDS HEROISM OF HIS MEN.—Secretary Daniels to-day made public a summary of the report made by Lieut. Commander David W. Bagley on the sinking and loss through German submarine attack of the American torpedo-boat destroyer *Jacob Jones*, of which he was the commander, on December 6. The location of the destroyer when attacked is not disclosed, but from the fact that Commander Bagley and four others were able to go in a motor dory to the Scilly Islands, it is still believed here that the attack occurred at a point in the Atlantic nearer to those islands than to any continental port.

Commander Bagley has especially commended the work of the following officers and men of the *Jacob Jones*:

Scott, Lieutenant Norman, St. Louis.
Richards, Lieutenant J. K., Washington.
Kalk, Lieutenant S. F. (Junior Grade), Washington.
Gates, Lieutenant Nelson N. (Junior Grade), Bay City, Mich.
Charlesworth, Charles, boatswain's mate, first class, New York.
Burger, Philip J., seaman, second class, Lansingburg, N. Y.
Kelly, Laurence J., chief electrician; next of kin and home address not given in department records.
Chase, Howard U., Quartermaster, third class, Nantucket, Mass.
Gibson, Harry Louis, chief boatswain's mate, Philadelphia.
Meier, Edward, water tender, Bay City, Mich.

Bagley's Report Summarized.—The summary of Commander Bagley's report was made public as follows:

The destroyer *Jacob Jones* was struck by a torpedo at 4.21 p. m. on December 6, 1917. The torpedo was sighted about abeam when at a distance of approximately half a mile. The officer of the deck, Lieutenant S. F. Kalk, who afterward died of exposure, took prompt and efficient measures to maneuver the ship so as to avoid being struck by the torpedo.

The commanding officer and Lieutenant Norman Scott, the executive officer, who were in the charthouse, heard the warning call that was given on the sighting of the torpedo and jumped at once to the bridge, where the commanding officer continued the maneuver begun by Lieutenant Kalk.

The commanding officer realized immediately that the torpedo was too near to allow time for the destroyer to maneuver clear of it. The torpedo struck abreast of a fuel oil tank, and immediately three large compartments were flooded, the deck over the fuel oil tank blown off, and the ship and fittings damaged in other ways. The ship quickly settled by the stern, and the engine room was soon flooded.

As the radio antennae and mainmast were carried away, and electric power failed immediately, it was not possible to use the radio apparatus. Two signal shots were fired from one of the guns. Immediately after the ship was torpedoed, and it was realized that she would sink, all efforts were bent toward launching rafts and boats, also splinter mats and lifebelts.

The gunnery officer, Lieutenant J. K. Richards, made every effort to get after to secure the depth charges, but was unable to do so. Before the ship sank three rafts were lost and another floated off when the destroyer went down. A small motor dory and two other small boats floated clear. The motor boat was seaworthy, but its engine would not run. One of the small boats was damaged, but was of use in getting men on the rafts. The whaleboat was launched, but was useless owing to damage from the explosion.

As the ship settled the commanding officer ran along the deck and ordered everybody to jump overboard. Most of the men who were not killed by the explosion got clear of the ship and reached rafts of wreckage, although a few were seen to be swimming at a considerable distance from the ship, having probably jumped overboard after the torpedo struck the vessel.

Destroyer Sank in Eight Minutes.—Eight minutes after being struck the destroyer sank stern first. About 15 minutes after the ship sank, the submarine came to the surface, approached within a half a mile of the rafts and picked up two survivors, although at the time only one was seen to be taken aboard. The submarine then submerged and was not seen again. Immediately after the sinking the commanding officer, who jumped overboard as the ship sank and was picked up by the motor dory, had efforts made to get all survivors on the rafts and get the rafts and boats together. He then began to make arrangements to reach the nearest land in the motorboat, so as to bring assistance to the survivors on the rafts. Lieutenant Richards received orders to take charge of the survivors and keep the rafts together.

The commanding officer and the navigating officer, Lieutenant Scott, knew accurately the position of the ship when she sank, and also knew the course to the nearest port. They therefore made the trip in the motor dory with four men to assist. All the provisions and medical kit from the motor boat were left with the men in the rafts, except a few emergency rations and half a bucket of water. The boat had to be pulled by oars, as the engine would not run.

After a very trying trip, during which it was necessary to steer by the stars and by the direction of the wind, the boat was picked up at 1 o'clock the next afternoon by a small patrol vessel. The senior officer of the station to which this patrol vessel belonged informed Lieut. Commander Bagley that the other survivors had all been rescued.

One small raft which had been separated from the others from the time of the sinking was picked up by the steamship *Catalina* at 8 p. m. on December 6. The remaining survivors were picked up at 8.50 a. m. on the 7th by a British patrol vessel.

Out of the total of seven officers and 103 men two officers and 64 men were lost. Two of these were captured by the submarine.

Commander Bagley gives unstinted praise to the behavior of officers and men.

Lieutenant Norman Scott, executive officer, accomplished a great deal toward getting boats and rafts in the water, turning off steam from the fire room to the engine room, getting life belts and splinter mats from the bridge into the water, in person firing signal guns, encouraging and assisting the men and, in general, doing everything possible in the short time available. He was of invaluable assistance during the trip in the dory.

Lieutenant J. K. Richards was left in charge of all the rafts, and his coolness and cheerfulness under exceedingly hard conditions were highly commendable, and undoubtedly served to put heart into the men to stand the strain.

Lieutenant Kalk, in the early part of the evening, although already in a weakened condition, swam from one raft to another in the effort to equalize weight on the rafts. The men who were on the rafts with him say that "he was game to the last."

Lieutenant Gates is reported calm and efficient in the performance of duty.

Gave Part of His Clothing to Others.—During the night Charles Charlesworth, boatswain's mate, first class, removed parts of his own clothing, when all realized that their lives depended on keeping warm, to try to keep alive men more thinly clad than himself. Commander Bagley recommends that he be commended for his action.

At the risk of almost certain death Philip J. Burger, seaman, second class, remained in the motor sailboat and endeavored to get it clear for floating from the ship. While he did not succeed in accomplishing this, which undoubtedly would have saved 20 or 30 lives, he stuck to duty until the very last, and is recommended as being most worthy of commendation. He was drawn under the water with the boat, but later came to the surface and was rescued.

L. J. Kelly, chief electrician, and Howard U. Chase, quartermaster, third class, remained on board until the last, endangering their lives thereby, to cut adrift splinter mats and life preservers. Kelly's stamina and spirit were especially valuable during the motor dory's trip.

H. L. Gibson, chief boatswain's mate, and Edward Meier, water tender, were of great assistance to the men on their rafts in advising and cheering them up in most adverse conditions.—*N. Y. Times,* 12/1.

IDENTITY OF TWO SEAMEN, TAKEN BY U-BOAT LEARNED.—The Navy Department has been informed through the Red Cross that the two men of the *Jacob Jones* captured by the German submarine which sank that destroyer on December 6 are Albert De Mello, seaman second class, and John Francis Murphy, ship's cook first class. They are held prisoners in Germany.

De Mello's father, Antonio V. De Mello, resides at 121 Hathaway Street, New Bedford, Mass.

Murphy's name was given as "Marfee" in a previous dispatch and a second inquiry was necessary to establish his identity.

Murphy gave as his next of kin, mother, Mrs. Julia Murphy, 53 Hall Avenue, Newport, R. I.—*Official Bulletin,* 10/1.

NORTH SEA

THE STORY OF H. M. TORPEDO-BOAT DESTROYER "SHARK," IN THE ACTION OFF JUTLAND BANK, MAY 31, 1916.—H. M. S. *Shark,* under the command of Commander Loftus W. Jones, went into action about 4.45 p. m. on the 31st of May with a complement of 91 officers and men. Of that number only six saw the dawn of June 1.

In spite of the soul-shaking experience through which they passed, these six men have remembered sufficient details of the action to enable the following record to be pieced together. Many stirring acts of gallantry and self-sacrifice, and much of interest to the relatives and friends of those who were lost, must inevitably be lacking from this narrative. But the evidence shows such supreme human courage and devotion to duty in the face of death that, incomplete as it is, the story remains one of the most glorious in the annals of the British Navy.

At 2 o'clock in the afternoon of May 31 the *Shark* and three other destroyers, *Acasta, Ophelia* and *Christopher* were acting as a submarine screen to the third battle cruiser squadron, with the light cruisers *Chester* and *Canterbury* in company. The force was steaming on a southerly course in advance of the British battle fleet, which was engaged in one of its periodical sweeps of the North Sea.

This advance squadron was under the command of Rear Admiral the Hon. Horace A. L. Hood, C. B., M. V. O., D. S. O., flying his flag in *Invincible.*

The main battle cruiser fleet and the fifth battle squadron were considerably further to the southward, and at 2.20 p. m. the light cruisers

attached to this force signalled by wireless the first intimation that the enemy's fleet was at sea. Subsequent reports confirmed this, and acting on the information contained in these intercepted messages, Rear Admiral Hood ordered the ship's companies to "action stations" and shaped course to intercept the advancing enemy.

At 3.48 p. m. the battle cruiser fleet and the fifth battle squadron engaged the German main fleet and turned north with the object of drawing the enemy towards the British battle fleet. It must be remembered that at this point the enemy was presumably in complete ignorance of the approach of the British main fleet. The weather was hazy, with very little wind and patches of mist that reduced the visibility to an extent that varied from one to eight miles.

At 4.04 p. m. Rear Admiral Hood received orders from Admiral Sir John Jellicoe, Commander-in-Chief, to proceed at full speed with his squadron and reinforce the battle cruiser fleet; the third battle cruiser squadron altered course as necessary and an hour and a half later the first sounds of firing reached them out of the mists ahead.

The first faint intermittent murmur of sound increased momentarily as the two forces converged, and at 5.40 p. m. the haze on the starboard bow was pierced by flashes of gun-fire; a few minutes later a force of German light cruisers and destroyers became visible, heavily engaged with an unseen opponent to the westward.

Fire was immediately opened, and Rear Admiral Hood turned to starboard, bringing the enemy onto the port bow of his squadron. Three light cruisers, a flotilla leader and 10 destroyers were now visible, the latter apparently turning to launch a torpedo attack upon the third battle cruiser squadron. The four destroyers which had hitherto been disposed in two subdivisions, one on each bow of the *Invincible*, were thereupon ordered to attack the enemy. Led by Commander Loftus Jones in *Shark*, the division swung around and hurled itself at the German force, opening fire with every gun that would bear.

In the meanwhile the enemy opened a heavy though ill-directed fire on the battle cruisers. A large proportion of the shots were falling short, and the British destroyers had in consequence to advance through a barrage of fire which surrounded them on all sides with columns of water and bursting shell.

In spite of their numerical superiority the German destroyers turned away in the face of this determined onslaught, and Commander Loftus Jones satisfied that the intended torpedo attack on Rear Admiral Hood's squadron had been frustrated, and having fired two of his three torpedoes, turned 16 points to regain his position on the bow of the *Invincible*. The remaining three destroyers followed in his wake.

Three German battle cruisers had then appeared out of the mist in support of the enemy light cruisers, and the gallant division with *Shark* at their head turned under a concentrated deluge of shells from the entire German force.

A fragment of a projectile struck the *Shark's* wheel, shattering it and wounding the coxswain, Petty Officer Griffin, on the right hand. The captain immediately ordered the after wheel to be manned and followed the coxswain down the ladder to the shell-torn upper deck to con the ship from aft. The yeoman of signals, Petty Officer Banham, who up to this point had been the third occupant of the bridge, hurried after the captain.

The enemy were now using shrapnel, and the captain was wounded in the thigh and face as he reached the bottom of the ladder. He stumbled aft, endeavoring to stanch the flow of blood with his hands, to find on reaching the engine room hatchway that a shell had burst inside the engine room and the main engines and steering gear were completely disabled. The coxswain had been struck at the same time as the captain, and dropped insensible from a wound in the head. The foremost gun, under the command of sub-Lieutenant Vance, had been blown away and only one survivor of its crew lay badly wounded amid the wreckage.

The *Shark* was then lying with disabled engines helpless under a heavy fire, and Lieutenant Commander John O. Barron, who commanded the *Acasta* and had been second in the line, gallantly brought his destroyer between the *Shark* and the enemy's fire and signalled to ask if he could be of any assistance. The captain of the *Shark* was then aft cheering and encouraging the crews of the midship and after guns. The yeoman of signals who remained at his side read the signal and reported it to the captain, who replied, " No. Tell him to look after himself and not get sunk over us."

The yeoman of signals accordingly semaphored Commander Jones' last signal to the division under his orders, and the *Acasta* followed in the wake of the other two boats which were rejoining the battle cruisers.

It is probable that at this juncture Rear Admiral Hood sighted the British battle cruiser fleet, which he had been ordered to reinforce, and proceeded to carry out his orders. The third battle cruiser squadron vanished into the mist and the enemy closed in upon the *Shark*, which lay rolling helplessly in the swell, blazing defiance from her after and midship guns.

The after gun was almost immediately put out of action and its crew killed or wounded. Amid a hail of shrapnel bullets and flying splinters the spare torpedo was hoisted off the rack, and under the directions of the captain, was being launched into the tube, when it was struck by a shell and burst with a violent explosion, causing heavy casualties.

Only one gun, the midship one, now remained in action. The ship was settling down by the bows and every moment she shuddered with the impact of a fresh hit. The riven upper-deck was a shambles, and the dead, mingled with shattered wreckage, were blown hither and thither by the blast of exploding shell. Projectiles, pitching short, flung great columns of water into the air, or passed screaming overhead; the upperworks were riddled by splinters from bursting shells.

One by one the wounded crawled brokenly into the lee of the casings and funnels in pitiful attempts to find shelter; among them knelt the devoted figure of the surgeon, endeavoring single-handed to cope with his gallant hopeless task. When last seen he was bandaging a man who had lost a hand when the torpedo exploded. He was then himself severely wounded and was apparently shortly afterwards killed.

The enemy had then closed in to a range of about 1500 yards; the survivors of the engine room staff had come on deck and the captain ordered the collision mats to be placed over the shot holes and every attempt to be made to plug them and keep the ship afloat. This was accordingly done under the direction of Lieutenant Ernest T. Donnell, the first lieutenant, who appears to have been still unwounded and maintained a cheering spirit of indomitable pluck to the last. The coxswain, who had recovered consciousness, though half blinded by blood from his wound, superintended a party who, under the captain's orders, were turning out the boats and endeavoring to launch the rafts. The boats were smashed by shell-fire while still at the davits, but three rafts—two regulation life-saving rafts and an extemporized affair of four barrels lashed together—were placed in the water.

In the meanwhile the midship gun, under the command of Midshipman T. Smith, R. N. R., maintained a steady fire. The stock of percussion tubes threatened to run short at one time, and the gunner, W. Gale, though severely wounded, crawled down below and brought a fresh supply, shortly after which he was killed. Leading Signalman Hodgetts, who had been previously working as one of the ammunition supply party, was blown overboard by the explosion of a shell; a few minutes later his dripping figure appeared over the rail and he cooly resumed his work. By some curious freak of chance he was again blown overboard by the blast of a shell, but again he clambered back to his place of duty, and his death.

The crew of the midship gun was ultimately reduced to two men, Able Seaman Howell, the gunlayer, and Able Seaman Hope. The midshipman

trained the gun while Hope loaded and Howell fired. The captain stood beside the gun giving them the range, heartening the remnant of the crew by his example of cool courage. Howell, who had been severly wounded eventually dropped from loss of blood, and the captain took his place. A moment later he was himself struck by a shell which took off his right leg above the knee.

He lay on the deck in the rear of the gun while the coxswain and a chief stoker named Hammell between them improvised a tourniquet from a piece of rope and fragment of wood. While they were endeavoring to stop the bleeding, Commander Loftus Jones, in the words of an eye-witness who survived, "Gentleman and Captain as he was" continued to direct the firing of the gun.

In all history the unquenchable Spirit of Man has rarely triumphed so completely over shattered nerves and body. As his strength ebbed Commander Loftus Jones seems to have been overtaken by fear lest the ship should fall into the hands of the enemy, and seeing the German destroyers approaching, he gave orders for the *Shark* to be sunk. A moment later, however, the gun fired another round and apparently realizing that the ship was still capable of further resistance he countermanded the order, adding, "Fight the ship!"

The gaff on the mainmast at which the ensign was flown had been broken by a shot, and the flag hung limp against the mast. The mind of the captain must have turned at the last to that emblem of all he was dying for so gallantly, for presently he asked faintly what had happened to the flag. One of the men tending him replied that it had been shot away, and in great distress he ordered another to be hoisted immediately. Able Seaman Hope accordingly left the gun, and climbing up, detached the ensign and handed it down to Midshipman Smith who bent it on to a fresh pair of halyards and hoisted it at the yard-arm. The captain seeing it once more flying clear said, "That's good," and appeared content.

The end was now drawing very near. The bows of the *Shark* had sunk until the foremost funnel was awash, and the waves were lapping over the water-logged hull. Seeing that two German destroyers had approached to within a few hundred yards with the evident intention of administering the *coup-de-grace,* Commander Loftus Jones gave his last order to the ship's company, "Save yourselves."

He was helped into the water by the coxswain and a number of others who had tended him devotedly after he received his mortal wound, and floated clear of the ship with the support of life-belt. The remainder of the crew to the number of about a score swam towards the rafts and pieces of floating wreckage.

Two torpedoes struck the *Shark* amidships almost simultaneously. With a muffled explosion she lurched violently to starboard, flinging overboard the dead and wounded who still remained on deck. Her stern rose until it was almost perpendicular and she sank with colors flying, about an hour and a half after firing her first shot.

Stoker Petty Officer Filleul and Able Seaman Smith succeeded in placing the captain on the raft of barrels, where they propped him in a sitting position with the aid of life-belts and buoys. While this was being done the captain attempted to smile, and shook his head saying, "It's no good, lads."

Stoker Petty Officer Filleul remained by the captain, and Able Seaman Smith swam to one of the other rafts on which Griffin, Chief Stoker Newcombe, Yeoman of Signals Banham, Stoker the Coxswain, Petty Officer Swan and Able Seamen Hope and Howell had succeeded in crawling. The three rafts drifted within sight of each other through the long northern summer twilight.

Shortly after the *Shark* sank the British battle cruisers swept past in pursuit of the enemy. The captain asked if the pursuing ships were British Filleul replied that they were, and the captain said, "That's good!"

Not long afterwards his head fell forward and his gallant spirit fled.

The second life-saving raft had been so damaged by shell-fire that only two men could be accommodated upon it. The two most severely wounded (one of them had lost a leg) were helped on to it by a number of others who themselves clung to the edge, among them being the first lieutenant. Able Seaman Smith, on the other raft, realizing that the majority were badly wounded and being himself only slightly hurt, swam over to render what assistance he could. The first lieutenant, who had unfailingly cheered and comforted the stricken little band, presently asked if any could still sing, and then, without faltering, himself began:

"Nearer, My God, to Thee."

Those who had the strength joined in as they clung submerged up to their shoulders in the icy water, almost unrecognizable from the thick black oil which floated on the surface; and so, one by one, death overtook them. Able Seaman Smith alone survived more than a couple of hours.

While it was still light the British battle fleet was sighted through the mists, and the drenched, haggard figures on the other raft cheered it as it passed five miles away. With indomitable optimism they all clung to the hope of a speedy rescue, and Able Seaman Howell semaphored across the waste of water, "We are British," in the hope that it would be read by one of the distant ships.

The twilight deepened into dusk and the raft on which Able Seaman Smith alone survived was lost to sight. The six occupants of the other sat with the waves washing over them, nursing their wounds and debating the prospects of being picked up. The yeoman of signals rambled into delirium at times and finally said, "I must have a sleep. Let me get my head down."

Able Seaman Hope attempted to dissuade him but without avail. "I must sleep," he insisted pathetically, and as he stretched himself in the bottom of the raft the ruling instinct of the service came back through the mists of death. "Give us a shake if the captain wants anything," he said, and his loyal spirit passed to join that of his captain.

Shortly before midnight the distant lights of a steamer were sighted. Able Seaman Howell then remembered for the first time that he had fastened a Holmes' light with wire on one of the rafts a few days previously. Steadying himself with difficulty on the pitching raft he fumbled along the edge and presently found the little tin cylinder that was to prove their salvation. With the last remnants of his failing strength he wrenched the nippel off, and the carbide, ignited with the water that washed over them, burnt with a bright flare. They waved it frantically and tried to shout; but the flare was seen and presently out of the darkness loomed the hull of the Danish S. S. *Vidar*. Her captain brought the ship alongside the raft, and one of her boats, which had already picked up Able Seaman Smith off his raft, presently rejoined them.

All survivors have testified to the high courage of Able Seaman Hope. Throughout the whole ordeal his plucky personality came constantly to the fore, and he alone retained strength to climb on board the *Vidar* unaided. On reaching the upper deck he refused to go below or receive any attention until the remainder of his shipmates had been hoisted on board.

The *Vidar* cruised in the vicinity for upwards of two hours in the hope of picking up further survivors, and Stoker Petty Officer Filleul was seen floating on the water and rescued as he was losing consciousness. No further traces of the *Shark's* crew were found, however, and the *Vidar* shaped course for Hull. On the passage Chief Stoker Newcombe, who had been wounded at the commencement of the action, succumbed to exhaustion in spite of every endeavor to save his life.

His Majesty the King, in recognition of the valor of the captain, officers, and men of the *Shark*, granted Commander Loftus W. Jones, the only posthumous honor that can be awarded in either service, the Victoria Cross. The six survivors, each of whom had played his part with the utmost gallantry, were decorated with the Distinguished Service Medal.

A few weeks after the action the fishermen of the little village of Fiskebackskie, an the coast of Sweden, found washed ashore the body of Commander W. Loftus Jones, V. C. It was buried in the village church yard on the 24th of June, with every token of sympathy and reverence.—*Navy and Merchant Marine*, December.

THE WAR AT SEA.—By a British Naval Officer.—The Admiralty made a further announcement on the subject of the action in the Heligoland Bight on Saturday, November 17. It will be remembered that in the announcement made earlier it was stated that the Admiralty were yet without detailed information as to the operation. In the further *communique* and that issued by the Germans on the same day it was revealed that the British force which engaged the enemy was an advanced body which actually pursued the enemy through his own minefields. This advanced force only broke off the engagement and turned back to meet its supports outside the minefields when four enemy battleships and battle cruisers were sighted. That the affair did not attain larger proportions was due to the fact that the British supporting force found the area within the minefields too restricted to maneuver in, and the enemy were too cautious to venture outside the minefield. It was suggested in these columns that this affair, like others of a similar nature which had previously occurred, was more or less accidental—that is to say, it did not arise from a concerted operation against the Germans, such as the action which the Admiralty reported to have had both "fortunate and fruitful" results in September, 1914. It was regarded, in fact, as a casual encounter brought about by the vigilance and energetic action of the British patrols rather than what was officially described three years ago as "a sweeping movement," designed "to cut the German light craft from home and engage them at leisure" in the open sea. Sir Cyprian Bridge, in an article in the *Sunday Times*, appears to take this view also, since he says that scraps of the character of that of November 17 "tend to test not only the efficiency of the look-out kept by the navy, but also its quality when suddenly confronted with an enemy force." The British patrols are not engaged in cruising about the North Sea aimlessly, but there must be many, many days and nights when they are "on the spot" to no purpose, and, considering the vast expanse of water to be covered, it can surprise no one if it is only at comparatively long intervals that a hostile collision actually takes place.

This action in the Bight should serve as a reminder to the public of the entirely changed condition in those waters since the scooping action was put in execution a little more than three years ago. There is not a word in the official *communiqué* of that time of danger to be expected from the minefields of the locality where the engagement took place. Indeed, it was only from the reports of the submarines that it was known there were minefields there at all, and these were probably of small dimensions. Matters are very different to-day, and without a large force of mine sweepers and their covering vessels it may be questioned whether what Admiral A. H. Christian described in his report of the affair of August 28 as "a reconnaissance in force" could be carried out. Naturally, however, if our patrols in their cruises along the outer edge of the German minefield should chance to sight a detachment of the enemy they would most certainly endeavor to engage it and, if possible, prevent it from returning to safety. This is clearly what happened on this occasion, and it was possible to continue the chase through the minefields because the flying enemy showed the way. Sir Cyprian Bridge, in the article already referred to, suggests as a reason for the enemy being sometimes found outside his fixed defences, that the German naval authorities having said that they can send their men-of-war to sea, find it necessary to give occasional proof that this is really done. There may, however, be other reasons. It will have been noticed that the enemy detachments sighted by our patrols usually include minesweepers, and it may be conjectured, therefore, that the enemy when

contemplating a raid or "an enterprise directed northward," find it expedient to insure that a passage exists for the force they desire to employ. It is not easy to believe that the German naval authorities hold it necessary to risk their ships merely to make good the boastful assertions with which they gratify their people. Even the misleading messages in which, by wireless, they announce an engagement when it does come off cannot disguise the fact that their main fleet refuses to accept action and its small craft are driven to take shelter. In August, 1914, the *Cologne Gazette,* in what was evidently an inspired article, said: "Great Britain calculates on the German fleet, on account of its fighting courage, being tempted to risk itself in a foolhardy manner. But the German naval authorities will not fulfil the British expectation." The German naval authorities never have had any idea of sending out the High Sea fleet to sea to try conclusions with ours in a general action, and, after Jutland confirmed their apprehensions of what might happen, they never will.

The announcement of the German Government that it has extended its "barred zone" is on a par with other declarations of "frightfulness." It is intended, according to the *Berliner Tageblatt,* to facilitate the task of the submarine, but exactly how it is to do so the German newspapers do not explain. The official notice states that the widening of the zone consists chiefly of an extension to the westward of the danger area which encircles this country, but there have been no signs up to the present that the submarines have put any limit to their activities in this direction. This may be said also of the new barred zone to be created around the Azores. Possibly they may now have a greater number of the larger submarines which are enabled by their size to exercise a more extended mobility, but by this time the Allies are not without means for meeting the threat of the heavier boats, as they have met that of their lighter consorts. The closing of the alleged free channel to Greece has already been anticipated, and it may be concluded that the official notice is deemed by the German authorities to be a concession to the feelings of their friends in that country. Like the notice about the respite to neutral ships and ships of the Belgian Relief Committee, any seeming concession which the Germans may make is not likely to have more value than that made on any other scrap of paper. In all probability, the true inwardness of this notice lies in the fact that the enemy are once more about to attempt a campaign of the utmost intensiveness. It may be deemed a warning that they are again about to put forth their full strength with every available submarine. It may show also that this attempt will be carried out further into the Atlantic, with the result, of course, that the crews of the ships which fall a victim to it will stand a poor chance of reaching land in their boats, even if they are not accorded the inhuman treatment expressed in the policy "sink without a trace."—*Army and Navy Gazette,* 14/12.

BRITAIN SHOCKED BY NAVAL REVERSE.—The successful attack by German warships on a convoy in the North Sea resulting in the sinking of 14 vessels, as announced in the House of Commons December 17, came as an uncomfortable surprise to the British public. It is expected to cause a revival of the serious criticism of the Admiralty such as at the time of the successful German attack on a convoy of Scandinavian merchantmen in October.

Added to this is the raid made off the Tyne last Wednesday by German warships. As a result of these two expeditions one British destroyer has been sunk, another seriously damaged, five trawlers and eight merchantmen have been sent to the bottom, another trawler has been damaged and a number of men have been killed, wounded or taken prisoner. Among the prisoners is a nephew of Viscount Grey, former foreign secretary.

According to the Danish accounts, the force which attacked the convoy consisted of four cruisers, in addition to destroyers. A painful aspect of the affair, from the British public's point of view, is that apparently all the

attacking vessels escaped and returned to their bases. Another unpleasant feature is that the British cruiser squadron detailed to protect the convoy against surface attacks for some unexplained reason was not on the scene. Vice Admiral Beatty immediately opened an inquiry, and the first sitting was held December 23, being conducted by Vice Admirals Sturdee, de Robeck and Goodenough. The investigation will be hastened as much as possible.

According to the testimony of survivors both here and in Scandinavia, the fighting was of most violent character. The Germans poured hundreds of shots into the ill-fated vessels.

Testimony given at the inquest over the victims of the German attack on the British convoy shows that the attack occurred between 4 and 5 o'clock on the morning of December 12 and that the enemy destroyers fired as rapidly as possible for a few minutes. A Swedish steamer was torpedoed twice, the second torpedo cutting the vessel completely in two. Of the crew of 20 hands on board it 16 were either killed or are missing.

No assistance was rendered by the enemy boats. British destroyers came upon the scene and rescued the survivors.

The merchant vessels were being convoyed by the destroyers *Partridge* and *Pelew*. The *Partridge* was sunk and the *Pelew* was damaged.

Sir Eric Geddes said the circumstances of the attack, so far as available, were that the *Partridge* sighted four enemy destroyers shortly before noon, and, with the *Pelew,* engaged them, while the convoy scattered. The *Partridge* was hit heavily. Shortly afterward an explosion occurred aboard and she sank. The *Pelew* was pierced at the water line and her engines were disabled, but eventually she was brought safely to port. The enemy then attacked the convoy sinking the merchantmen and armed trawlers.

The entire crew of the trawler *Lord Alveston* was saved in one of its own boats. The casualties on the *Pelew* were one officer and three men killed and two wounded seriously. Information regarding the crew of the *Partridge,* Sir Eric said, was incomplete, but a report from Kiel told of the taking there of three officers and 21 men from the *Partridge* and of one officer and 25 men from the trawlers.

Eighty-eight Scandinavians, two of whom are women, and 10 British were rescued by four British destroyers detached from a cruiser squadron which was hastened to the scene. Other survivors reached Norway in boats.

German Official Report.—The following official communication was issued December 14, dealing with German naval attacks on commercial traffic off the east coast of England and in the North Sea last Wednesday:

"Simultaneously with an attack on commercial traffic on the English east coast our light forces on December 12 under command of Lieut. Captain Hans Kolbe, again attacked a convoy.

"The convoy consisting of six steamers totaling 8000 tons, including an armed English steamer, the torpedo-boat destroyer *Partridge* and four armed vessels, were destroyed in battle. The English destroyer *Pelew* escaped damaged.

"Our forces returned without losses and with a large number of prisoners, including four officers."—*Washington Star,* 18/12.

NOBODY TO BLAME FOR CONVOY DISASTER.—In the House of Commons today Sir Eric Geddes, First Lord of the Admiralty, made this statement concerning the attack by German warships on a convoy in the North Sea December 12, in which one British and five neutral merchantment, a British torpedo-boat destroyer, and four armed trawlers were sunk:

"The Admiralty finds that the escorting vessels did their best to protect the convoy and were fought in a proper and seamanlike manner, and that other forces at sea for the purpose of protecting took all possible steps to come to their assistance and prevent the escape of the enemy.

"It is due to Vice Admiral Sir David Beatty, commander of the Grand fleet, to say that the Admiralty finds the circumstances which prevented covering forces from behind reaching the spot were such as could not be prevented and that the commander-in-chief's dispositions were the best that could have been made with the forces available."—*N. Y. Times,* 15/1.

ARMED BRITISH SHIP SUNK BY SUBMARINE.—The British armed steamship *Stephen Furness* has been torpedoed and sunk by a German submarine in the Irish Channel, it was officially announced December 22. Six officers and 95 men were lost.

The *Stephen Furness* was a merchantman of 1712 tons gross, built in 1910 at West Hartlepool, and owned by the Tyne Tees Shipping Company, Ltd., of Newcastle. She was one of the many merchantmen that have been refitted by the Admiralty for naval uses.—*N. Y. Herald,* 23/12.

"U-53" CAPTURED.—The *U-53,* the German submarine which visited Newport over a year ago and then sank several ships off Nantucket, has been captured by the French.

The U-boat was taken by a French destroyer and two minesweepers. The big submersible is now in allied service and has accounted for several enemy submarines, which, recognizing her lines as Hamburg-built, approach her without fear, as the *U-53* usually runs awash.—*Baltimore News,* 28/12.

ZEPPELIN DROPS INTO SEA.—A Zeppelin and a seaplane which was accompanying it have been wrecked in the North Sea, according to a *Central News* dispatch from Copenhagen, quoting advices received there from West Jutland.

The Zeppelin is said to have fallen in flames to the sea.—*Washington Post,* 30/12.

THREE BRITISH SHIPS LOST.—Three British torpedo-boat destroyers were sunk through being struck by torpedoes or hitting mines off the Dutch coast on the right of December 22, with the loss of 13 officers and 180 men, the Admiralty announced December 29. The text of the statement reads:

"Three of our destroyers were mined or torpedoed during foggy weather off the Dutch coast on the night of the 22d of December. A total of 13 officers and 180 men were lost."

Whether correctly or not, the supercession of Admiral Sir John Jellicoe as First Sea Lord is popularly believed to have been the direct sequel of the loss of the three destroyers. This incident has been generally known here, although only just announced officially.

The First Lord of the Admiralty, Sir Eric Geddes, went several days ago to Sandringham, where the royal family is staying for the holidays. He was received in audience by the King on Christmas, which indicated that the business was unusually urgent. The Admiralty changes were announced the next day.—*N. Y. Times,* 30/12.

BRITISH DESTROYER LOST WITH ALL HANDS.—The British destroyer *Racoon* struck rocks off the Irish coast on Wednesday and foundered, it is announced officially. All on board were lost. The text of the statement issued by the Admiralty says:

H. M. S. *Racoon,* Lieutenant George Napier in command, struck on the rocks off the north coast of Ireland at two o'clock in the morning during a snowstorm, and subsequently foundered with all hands.

Nine of the crew had been left behind at her last port of call, and these are the sole survivors. Seventeen bodies have been picked up by patrol craft and are being buried at Rathmullen. Five more bodies were washed ashore, and they are being buried locally.

The *Racoon* was built in 1910. She was 266 feet long and displaced 915 tons. She was armed with one 4-inch and three 3-inch guns, and two torpedo tubes. Her normal complement was 105 men.—*N. Y. Times,* 13/1.

BRITISH LOSE TWO DESTROYERS IN GALE.—The British Admiralty announces the loss of two torpedo-boat destroyers in a violent gale and a heavy snowstorm last Saturday night. The vessels ran ashore on the Scotch coast and were wrecked and all hands on board were lost, except one man.—*N. Y. Herald,* 18/1.

FRENCH MERCHANT SHIP FIGHTS.—An inquiry was made into the conditions in which encounters have taken place between French merchantmen and enemy submarines between January 1 and August 1, 1917. It is stated that the French ships were successful in 106 of these encounters. In 34 cases success was due to maneuvering, and in 62 to the use of artillery. In 13 cases it was not the submarine which began the fight. There were even occasions when merchant vessels chased their enemy. In three cases the French vessels escaped by beaching. On June 5 the French steamship *Diane* was sunk by an enemy submarine in the English Channel.—*Journal United Service Institute,* November.

HOSPITAL SHIP TORPEDOED; ALL OF WOUNDED SAVED; THREE SAILORS MISSING.—The hospital ship *Rewa* was torpedoed and sunk in the Bristol Channel on January 4, while on her way from Gibraltar, it is announced officially.

All the wounded were rescued.

There were three casualties among the crew.

"His Majesty's hospital ship *Rewa* was torpedoed and sunk in the Bristol Channel at about midnight on January 4 on her way home from Gibraltar. All the wounded were safely transferred to patrol vessels. There were only three casualties among the crew, three Lascars being missing.

"She was displaying all the lights and markings required by The Hague convention. She was not and had not been within the so-called barred zone, as delimited in the statement issued by the German Government on January 19, 1917."

After making several charges of the misuse of hospital ships, which were denied specifically by the Entente Governments concerned, the Germans last year suspended the immunity of these vessels in the English Channel and certain other waters.

The British discontinued special markings of hospital ships, on the ground that they were merely rendered conspicuous thereby and were more liable to attack. Last September King Alfonso of Spain intervened and succeeded in obtaining an agreement from the belligerents for the free movement of hospital ships within specified areas.

The British steamship *Rewa* is of 7308 tons gross and 456 feet long. She was built in 1906 and owned in Glasgow and has been in the service of the British Government.

The Bristol Channel is an arm of the Atlantic extending into the southwestern part of Great Britain between Wales and the southwestern counties of England.—*Baltimore News,* 9/1.

AN INTERESTING PRECEDENT.—German denials of the torpedoing of the hospital ship *Rewa* serve as a reminder of that famous *Sussex* denial, fortified by the submarine commander's drawing. Only last week Germany agreed to pay a large sum of money by way of indemnity to the family of a Spaniard who lost his life on the torpedoed *Sussex.* That was an interesting admission of Germany's guilt.—*N. Y. Herald,* 14/1.

A GERMAN WARSHIP BOMBARDS YARMOUTH.—Yarmouth was bombarded from the sea last night, it is announced officially; about 20 shells fell in the

city. Three persons were killed and 10 injured. The enemy craft presumably was a submarine or a light cruiser. The bombardment, which was preceded by illumination of the town by large star shells, continued about eight minutes. The inhabitants were taken completely by surprise.

Owing to the blackness of the night the enemy was not seen. He fired 20 to 25 shells in rapid succession. Many windows were shattered and a number of roofs and chimneys were wrecked.

Most of the inhabitants were in bed at the time of the attack. One of the three persons killed was a sailor aboard ship, who had escaped submarines in midocean. The other two were killed in the street. There were many narrow escapes among the occupants of the damaged houses.

Attacks by German naval forces on English coast towns, of which there were a number early in the war, have been infrequent in recent months. The last previous occurrence of the kind officially reported was on September 4 of last year. On that day a German submarine bombarded Scarborough, causing the death of three persons and the injury of five.

Yarmouth is on the North Sea 115 miles northeast of London. It is a city of some 50,000 inhabitants, with important shipbuilding and fishing industries.—*Baltimore American*, 16/1.

BALTIC

TWO HUNDRED AEROPLANES WOULD HAVE ENABLED THE RUSSIANS TO CHECK THE GERMANS AND PREVENT CAPTURE OF STRATEGICAL BASES IN THE GULF OF RIGA.—Once more Russia has suffered defeat through her lack of aircraft. In 1914-1915 Russia suffered great losses because she did not have a hundred or so additional air scouts to direct the movements of the Russian forces and warn them of the movements of the Germans.

Russia's recent losses and her inability to check the Germans in the naval operations which resulted in the Germans capturing the important Islands of Dago and Oesel and resulted in the loss of the large Russian dreadnought *Slava* was due more than anything else to the lack of 200 additional fighting aeroplanes with which to defeat the German Zeppelins and aeroplanes which directed the operations of the German forces.

Had they been able to maintain their aerial supremacy, the Russians could have prevented the blockade of the Gulf of Riga and Moon Sound and the landing of troops on the Dago, Oesel, Runo and Moon islands, which resulted in the capture of 10,000 Russian troops and 50 cannons.

It was known that the Russians had only a handful of aviators to protect the group of Baltic Islands which lies between the Gulf of Finland and the Gulf of Riga, off the Esthonian coast. That they fought the German aerial forces was shown by the reports which stated that two German aviators were shot down.

The aerial engagements between the German and Russian aerial forces preceded the naval engagement. It took place on the northern coast of the Island of Dago, to which the Germans came from the open sea. Having disposed of the few Russian aviators, the German naval forces could operate unhindered, using their Zeppelins and aeroplanes to direct their ships which located the entrance to the Moon Sound, protecting the ships from British and Russian submarine attacks. The blockade of the entrance to the Moon Sound between Dago Island and Oesel Island, which was supposed to be well fortified, seems to have taken effect without any fighting.

The next step of the Germans was to force the entrance to the Gulf of Riga to the south of the Oesel Island. Ever since the Germans captured Libau, the important Russian naval base on the Baltic, it was obvious that their next step would be to attempt the forcing of the entrance to the Gulf of Riga. The Russians are known to have mined the entrance to the Gulf and to have blocked it by dumping into it every available material. But the Germans seem to have succeeded in sweeping the mines and clearing the channel.

There were no engagements at the entrance of the Gulf. The Russian fleet moved to Moon Sound, the plan being to seek protection in the Gulf of Finland. The German fleet checked it and during the engagement the Russian ship the *Slava* was sunk at the southern entrance of the Moon Sound, the German guns outranking the Russian guns and four German seaplanes participating in the attack.

The Germans seemed to feel sure that they had bottled up the Russian fleet and proceeded to bombard the islands and to land troops on the Oesel and Dago islands. On October 15 they captured Arensburg, the main city of Oesel Island, and isolated a Russian force in the extreme south of the island. The escape of the Russian fleet seems to have been made possible by the laxity of the German air forces at night.

The German operations from the start were directed by Zeppelins and aeroplanes. It was an easy task because the area of danger from Russian and British submarines was small, extending only to the entrance of the Gulf of Finland and the entrance between the Oesel Island and the mainland. It is evident from the fact that the Germans landed their troops on the Karsar Bay side and from the Gulf side of the Oesel Island that they expected submarine attacks. Therefore, they selected as a landing place for the troops the places which could best be protected from the Russian and English submarines.

One hundred fast fight planes and 100 large torpedoplanes and bombing aeroplanes could have protected these important Russian positions better than their many cannons and warships. The fast fighting machines would have kept the sky clear of German aeroplanes and the torpedoplanes and the bomb dropping machines could have inflicted tremendous damage on the German fleet, sunk the transports and torpedo-boats and damaged even the largest ships. At all events, they could have prevented the carrying out of operations by their continuous attacks on them.

There is little doubt that the best thing that the United States and the Allies can do to help Russia is to supply her with aeroplanes and aviators in large number, and to begin to conduct aerial operations against German military and naval bases from the Russian side, thereby keeping tens of thousands of Germans busy protecting their bases on the Russian fronts, and preventing the concentration of their forces elsewhere.—*Aviation.*

THIRTY-EIGHT OFFICERS SLAIN IN U-BOAT MUTINY.—A mutiny among submarine crews at the German naval base of Kiel, on January 7, is reported in an Exchange Telegraph dispatch from Geneva. Thirty-eight officers are said to have been killed.

The Geneva dispatch quotes advices received there from Basel, giving details concerning the mutiny. It is said to have been begun by submarine crews, and subsequently to have spread to portions of the crews of cruisers stationed at Kiel.

Some of the men who joined in the attack on the officers took part in the earlier mutiny at Kiel, the dispatch reports. It adds:

"Although the mutiny was local, it shows that German naval men are dissatisfied, especially in the submarine service, as the number of boats returning to German ports is decreasing every month."—*Evening Star,* 17/1.

MEDITERRANEAN

SUBMARINE IS SUNK FOLLOWING ATTACK.—A statement by the Ministry of Marine concerning the sinking of the old French cruiser *Chateau Renault* says that the warship, with several other vessels, was attacked by a submarine in the Ionian Sea at 7.15 o'clock on the morning of December 14. Continuing, the statement says:

"The torpedo struck on the starboard side in the region of the stokehold, which it flooded, and at the same time bursting steam pipes which stopped the engines.

"The captain at once manned the hand steering gear and steered so as to utilize the momentum of the ship and approach the shore, which was in sight. Passengers and the crew were ordered to their boat stations at the sound of the explosion. Torpedo-boat destroyers, which formed a part of the convoy, dashed in the direction from which the torpedo had come and volleyed shells at the spot where it was presumed the submarine had submerged.

"While the boats were being lowered from the *Chateau Renault*, the enemy submarine came up on her left. The cruiser had sunk to her gun ports, but nevertheless the gun crews remained at their posts and opened a hot fire on the submarine, which promptly dived. A second torpedo was fired shortly after and struck the *Chateau Renault* on the starboard side forward. She sank by the head a few minutes after the captain got aboard a patrol boat. All passengers were saved, but 10 members of the crew are missing and are supposed to have been killed by the explosion.

"The torpedo-boat destroyers, overloaded with survivors, renewed the attack on the submarine under water and then on the surface when she appeared for an instant, only to submerge again precipitately under fire of the guns of the destroyers. Two seaplanes then bombed her. The submarine probably had been struck by a shell so as to make it impossible for her to remain submerged, for she appeared once again and was immediately covered by a rain of shells.

"One of her gunners was swept overboard by a shell while in the act of aiming his piece, and all the others jumped into the sea, while the submarine sank like a stone torn to pieces by French guns. The prisoners number 22, among them the captain of the submarine and two officers."

The French cruiser *Chateau Renault* was laid down in 1896. She was 442 feet long, with a beam of 55.7 feet and displaced 7898 tons. Her complement before the war was 600 men. Besides being used as a cruiser formerly, the *Chateau Renault* had been fitted as a mine-layer.—*Washington Star*, 23/12.

AMERICAN SHIP "SURAGA" HIT BY TORPEDO.—The American steamship *Suraga*, a vessel of 4374 tons gross register, and owned by the New York and Oriental Steamship Company, was torpedoed and compelled to run ashore on December 27, while in Mediterranean waters, according to a report received in New York, January 8, in insurance circles.

The *Suraga* left New York the latter part of October for an Italian port and it is understood that she was returning and bound for a French port when torpedoed. So far as can be learned all of her crew are safe.—*Washington Star*, 5/1.

JAPANESE SAVE CONVOY.—*Warships Drive off Hostile U-boats in the Mediterranean.*—Enemy submarines which attempted to attack British transports convoyed by Japanese warships in the Mediterranean on December 30 were repulsed, says an announcement from the Japanese admiralty.

The warships were not damaged.—*Washington Post*, 6/1.

BRITISH DESTROYER TORPEDOED.—London, January 7.—A British torpedo-boat destroyer has been torpedoed and sunk in the Mediterranean Sea, according to an Admiralty announcement.

All the officers of the destroyer were saved, but 10 members of the crew were lost.—*Baltimore American*, 9/1.

ITALIAN SHIP SUNK.—*Practically New Steamer Torpedoed by U-boat.*—The big Italian steamship *Milazzo*, 11,477 tons gross register, was sunk during the early part of December by a German submarine while the ship was in Mediterranean waters, according to word received in New York shipping circles January 10. It is understood no lives were lost.

The vessel was practically new, having been launched in 1916, and while originally intended for passenger as well as freight traffic, was employed entirely for freight. She was owned by the Navigazione Generale Italiana, and was last reported in American waters the latter part of September, 1916. At that time she arrived with a damaged propeller, which was caused, it was understood, by an encounter with a U-boat. On her return voyage with a cargo of cotton she caught fire and had to put into Fayal. The fire was extinguished, and after a delay of about two weeks she proceeded on her voyage. The *Milazzo* was 492 feet long with a beam of 65 feet.—*Baltimore American*, 10/1.

ADRIATIC

THE WAR IN THE ADRIATIC.—By a British Naval Officer.—In the Adriatic where, from the beginning of the war, there has been naval co-operation of a very marked kind, the allied fleets have been performing some fine work in connection with the defence of the Piave line. The British monitors, which had been affording the Italians valuable assistance in their advance towards Trieste, are now rendering help in the great struggle against the Austro-German invasion. General Diaz, in an order of the day of November 21, referred to the valuable co-operation of the National Navy and the British monitors in the coastal zone. In a semi-official note also reference was made to the work accomplished by the navies of the allied powers when the right wing of the Italian Army was falling back. Much precious war material was saved, and when the enemy torpedo-craft appeared on the scene they were at once driven off with loss. It was, indeed, suggested at one time that, hoping to take advantage of the situation, the Austrian fleet was putting to sea, but this was denied afterwards, and was, indeed, unlikely, in view of the overwhelming superiority in naval strength of the Allies in the Adriatic. Among the unfortunate results of the occurrences on land may be counted the withdrawal of the threat to Pola given by the advance of the Italians, and which it was anticipated and hoped might force the Austro-Hungarian fleet to leave port. There can, of course, be no question that the loss of Monfalcone and the menace to Venice has deprived the Italians of useful naval bases in the Upper Adriatic, and at the same time has encouraged the Austrian seamen to attempt enterprises which were previously quite beyond their power. It is some time since any attempt on the Italian coast railway has been undertaken, and when a squadron of light craft made their appearance between Porto Corsini and Pesaro towards the end of last month the reception they received from the naval armored trains on the railway forced them to retire. An excellent description of these armored trains with the Italians, with illustrations, was given in Chapter CLXXXIX of the "*Times* History and Encyclopædia of the War." They are an adjunct of the navy which appears to have most adequately fulfilled its purpose. The last report concerning allied naval activity at the mouth of the Piave River was most encouraging. In an official *communiqué* it was stated that on the coastal area a British monitor obtained a direct hit on and interrupted a bridge of boats which the enemy had thrown across the river in the vicinity of Passarella, some 10 miles from the sea. Almost daily, said the military critic of the *Corriere della Serra*, the pontoon bridges which span the river in the neighborhood of Passarella are destroyed by the guns of the British monitors, but the enemy reconstructs them during the night. Mr. G. Ward Price, the correspondent of the *Times*, writing from Venice, mentions the monitor which destroyed the bridge at a range of 18,000 yards as the *Picton*, appropriately named after a British general. He says that at this range there were three bridges across the river 200 yards apart, and on these the monitor's guns put five direct hits out of seven shots. The first shot was on the target, and the pontoon bridges were each hit at either end, one of them being so effectively cut in two that the aeroplane observer reported that the middle

part of it floated away down stream. Another shell was dropped right into the third bridge, an old one made of stone, which the Austrians had repaired. This is a well-deserved tribute to the fine shooting of the bluejackets in the monitor, and also to the spotting of the observer in the aeroplane.—*Army and Navy Gazette*, 8/12.

ITALIANS ENTER TRIESTE HARBOR IN DARING RAID.—Two Italian torpedo-boats, under Lieutenant Commander Rizzo, composed the force which made the daring raid into the inner harbor at Trieste on Sunday night, December 9, and torpedoed two Austrian battleships, one of which was seen to sink. Further details of the exploit were received in dispatches by the Italian Embassy.

The raid was arranged when it was learned that the Austrians were preparing to send from Trieste two vessels of the *Monarch* type, with their 240-millimeter guns, to bombard the Italian coastal positions. A division of torpedo-boats, under Captain Pignatti, was assigned to the task, and the captain selected Lieutenant Commander Rizzo with two boats to make the dash into the harbor, while the remainder of the division kept outside in support.

By slow and silent movement through a heavy fog the little craft reached the extremity of the Muggia Pier, where the officers examined the disposition of the numerous obstructions which barred the passage. Mine fields and other obstructions were located, and two hours were spent cutting eight large wire cables stretched across the passage. Other obstructions were weighted and sunk sufficiently to permit the boats to pass over them.

During all this time Austrian outposts were very near and searchlights were being played on the water, but in spite of this the torpedo-boats succeeded in entering the inner port without being sighted.

Two Austrian battleships were discovered at anchor at the further end of the harbor near Point Sabba. Proceeding cautiously, the Italian vessels approached to ascertain whether there were any protecting nets or other obstructions, then took up positions for the attack.

Finally at half-past two in the morning of December 10 the two torpedo-boats simultaneously launched four torpedoes aimed at the battleships. All four torpedoes exploded. Rizzo reported that the battleship *Wien*, nearest the attacking vessels, was observed to sink in five minutes, while the other battleship certainly was struck, though owing to the great distance it was impossible to discover the damage done.

At the sound of the explosions Austrian batteries opened fire and searchlights swept over the waters. The lights located the attacking vessels and the Austrian guns were brought to bear on them and torpedoes fired, but the Italians escaped and returned safely to base with the supporting squadron.—*N. Y. Herald*, 18/12.

CZECHS GAVE UP WARSHIP.—The Slav Press Bureau makes public a dispatch from Geneva which says:

"The *Pesti Hirlap* of November 21 publishes a number of sensational revelations that were made in the Hungarian Parliament by the Magyar Deputy, Mr. Fenyes. Among these is an interpellation which is addressed to the Hungarian Cabinet in regard to the fate of the Austrain torpedo-boat No. 11, whose personnel consisted of Austrian officers and Czech marinés. Deputy Fenyes said: 'Before the Italian offensive the boat left the harbor of Cattaro in order to meet an incoming German submarine and convoy it through the minefields into the harbor. The torpedo-boat never reached its place of destination, however, and the German submarine waited in vain. For two weeks nothing was heard of the whereabouts of this torpedo-boat until the publication of a report by the Stefani Agency stating that it arrived safely in the Italian harbor of Brindisi. The report further stated that while they were on the way to meet the incoming submarine the Czech marines on board the vessel revolted, fettered their Ger-

man and Magyar officers, and steered the torpedo-boat into the Italian harbor.'

"This report is another evidence of the fact that the Czechoslovaks are determined to shake off the tryannous yoke of the House of Hapsburg, and that they will not desist in their opposition until complete independence is secured."—*N. Y. Times,* 30/12.

BLACK SEA

In the Black Sea our torpedo-boats *Pylkyi* and *Bystryi,* dispatched under the command of Captain Count Keller to destroy the Turkish steamer damaged by one of our submarines, discovered an enemy torpedo-boat and two steamers in Inda Bay. The enemy torpedo-boat was sunk and the two steamers were burnt.—*United Service Gazette.*

BRITISH BATTLEPLANE'S 2000-MILE FLIGHT TO BOMB CONSTANTINOPLE.—For the first time the amazing story of a British battle-aeroplane's flight to Constantinople from London, and its sequel in the bombardment of the German headquarters and the Turkish war office there, was told yesterday by Mr. Handley Page, and Mr. Basil Johnson, whose firm, the Rolls-Royce, Ltd., built the engines that flew the 2000 miles without a hitch.

Loading up at Hendon, the machine which with spares and luggage was more than six tons in weight, proceeded to Paris, Lyons, and to avoid the Alps, continued by way of Marseilles. From Marseilles the journey was by way of Spezzia to Risa, Rome, Naples and Otranto, which was the last point over friendly country. The next, and perhaps the most difficult stage of the journey, was over the Albanian Alps to Saloniki, a trip of 250 miles across mountains varying from 8000 to 10,000 feet, with no suitable place for landing in case of need.

Squadron Commander Savory, who was the chief pilot, told him, said Mr. Handley Page, that they could see wild Bulgarian horsemen below. who were running about in every direction, waiting for a chance to kill them if they came down.

From Saloniki the adventurous party flew to their base, overhauled the machine, and prepared for a long distance bombing expedition to Constantinople, a distance of about 320 miles.

On their attacking trip they set forth with 16 bombs, and on arriving at the Sea of Marmora throttled down from 2000 feet to 1600 feet, the Golden Horn and other points being clearly in view.

After a short survey of the lights of Constantinople, and in order to make sure of their objectives, they came down to 800 feet and dropped a salvo of four bombs, hoping to reach the *Goeben,* which was anchored just beneath them. Unfortunately they missed the vessel, but managed to hit one or two submarines that were lying alongside her.

Turning on their track they made another attempt on the *Goeben,* and this time, in spite of the attentions of a number of Turkish and German anti-aircraft guns, managed to plank four bombs on the battleship.

Then they flew up to a ship called the *General,* which was the headquarters of the German staff, and dropped two bombs on her, to the great consternation of naval and military officers assembled in her saloons.

One more target, too tempting to be missed, attracted the intrepid aviators, and they next made their way to that part of the town where the Turkish War Office was situated, and dropped two more of their bombs on the building. The Turkish official report on the latter incident quaintly minimized matters by saying "The war office was not destroyed."

After half an hour's bombing of Constantinople they turned around and started back to their base, Flight Commander McLellan relieving his chief in the steering. They had not escaped without damage, but even after one engine had been put out of action they were able to get away without serious damage from the "band accompaniment" of guns below, which had paid them a quite uncomfortable amount of attention.

On arriving back at the base no fewer than 26 bullet holes were found in the machine. The journey to Constantinople and back (640 miles) occupied seven hours.

Handley Page said Engineer Lieutenant Rawlings, who was one of the party, reported that they had no trouble at all with the engines, although the water in the radiator boiled as on a very hot day. He thought the flight, which constituted a world record for British aeroplanes, engines and aviators, showed the great possibilities of aerial long distance bombing expeditions during the war, and also that there were great possibilities for mail and freight carrying in times of peace.—*Washington Post,* 6/1.

GERMAN ADMIRAL HEADS BLACK SEA COMMISSION.—The Russo-German Commission which has gone to Odessa to discuss questions concerning the Black Sea has arranged a meeting for consideration of conditions under which interned civilians may be repatriated. The commission consists of 18 delegates, under the presidency of a German admiral. The chief Russian delegate is a sailor from the Black Sea fleet.—*N. Y. Herald,* 14/1.

BOLSHEVIKI SAILORS MASSACRE 60 OFFICERS OF BLACK SEA FLEET.—A terrible massacre of Russian naval officers of the Black Sea fleet by Bolsheviki sailors was reported from Sebastopol, January 14. At least 60 officers, four of them admirals, were said to have been slain during a two days' orgy of bloodshed.

A general was taken from the garrison and executed when he attempted to have loyal troops interfere. All of the officers of one ship were taken to Malakoff Tower and shot. The streets were littered with corpses of officers and men shot down in the fighting.—*Baltimore American,* 16/1.

TURKEY VIOLATES ARMISTICE.—Turkey has violated the armistice signed between the Central Powers and Russia, according to word received at Petrograd, January 14. The Ottoman commander, it was stated, had landed 20,000 troops between Trebizond and Rize and a Turkish submarine was reported to have sunk a Russian transport.—*Baltimore American,* 14/1.

UNITED STATES ARMY

BUSH TERMINAL, WITH BIG PIERS, TAKEN BY ARMY.—The Bush Terminal, comprising 20 city blocks, between Thirty-ninth and Fifty-first streets, Brooklyn, with 3100 feet of continuous water front, facing a 40-foot government channel, was requisitioned by the War Department yesterday.

The eight piers, each one-quarter of a mile in length, and the 120 warehouses will be used as a base for the Quartermaster's Department, United States Army.

The order for seizure of the terminal was issued in Washington, being practically the first official act of Major General Goethals, the new acting quartermaster general.

Word was at once telegraphed to Irving T. Bush, president, who last night informed a reporter for the *Herald* that every effort will be made by his working staff to assist the army in its operation of the terminal. He said between 2000 and 3000 employees will be affected immediately, and if the 20 miles of railroad and the industrial buildings are later commandeered a much larger force will pass under the control of the War Department.

Mr. Bush has been chief executive officer of the War Port Board since that organization was formed. He has just been notified he is appointed to a new post, that of Director of Harbor and Terminal Facilities of the Embarkation Service, United States Army. He will work in conjunction with Brigadier General Shanks, Military Commander of the Port of Embarkation in Hoboken. Mr. Bush said he regrets very much to see a business that it took 25 years to build up pass so quickly from his hands. He is very glad, however, to render assistance to the United States, he

insisted to a *Herald* reporter, and therefore willingly gives up the industries if his properties can be of use to the government.

At present the piers of the Bush Terminal are used by a score of steamship lines. One of these piers, with 15 acres of floor space, is used by the Russian Volunteer Fleet and other shipping companies of the Russian government. For months it has been practically idle, although millions of dollars' worth of supplies, ordnance and general merchandise are piled there. What to do with it is a problem—now to be settled by the United States Army.

Other steamship lines which must vacate are the Royal Belgium Line, the American-Hawaiian Steamship Company, the Austro-American Line (American agents have pier contracts), the Prince Line, Hansa Line, Norton Line, Bucknall Steamship Lines, Levant Line, American-African Line, Royal Dutch West India Mail, American and Australian Line and several others.

According to Moody's Manual, industrial section for 1917, the gross earnings of the Bush Terminal Company in 1916 were $1,955,237, and the operating expenses and taxes amounted to but $745,811. The real estate and improvements were valued December 31, 1916, at $13,437,383, and the total assets then amounted to $21,890,738.

Need for the proper protection of the Bush terminals has been recognized for several months by the War Department. An armed guard is maintained and sentries challenge everp yerson who approaches unless certain instructions are followed. From time to time the terminal has been used for loading of supply vessels with cargoes for the government, the Red Cross and Belgian relief. It is expected that ample time will be given all holding leases to find new docking space.—*N. Y. Herald,* 1/1.

THE AMERICAN ARMY which is to be sent into battle to make the world safe for democracy is rapidly being formed. In the nine months since the United States declared that a state of war existed with Germany the army has risen from 212,034 officers and men to 1,539,506 officers and men.

This statement has been made by Secretary of War Baker, who declared that no other army in the history of the world had ever been raised, equipped or trained so quickly.

The Secretary added that a "substantial" force of Americans already was in France and fit for active service, and that full equipment is on hand for every man who will be sent to Europe during 1918.

On the fighting fronts the infantry is inactive, except for small raiding operations, but the artillery duels continue intense on various sectors.—*Baltimore American,* 10/1.

ENEMY AIRPLANES DROP BULLETS AND BOMBS.—Enemy air raiders are showing an increased interest in the American aviation centers, especially those nearest the lines.

During one of the most recent incursions the German airplanes descended within 250 feet of the ground, endeavoring to make sure that the several bombs which they dropped should hit their targets, which in most cases were buildings in which men were billeted. Luckily, the German aim, even at such close range, was poor, for no Americans were killed.

Another German machine which flew over the position later dropped a bomb from a higher altitude at a hangar. The bomb missed its mark, but dug a great hole in the adjoining field.

Spray of Bullets on Position.—At a certain place nearby an enemy squadron descended within 300 feet of the earth and sprayed an anti-aircraft machine gun position with a hail of bullets, but did not hit any of the gunners, all of whom were French.

The Americans at the most advanced aviation camp have found a novel mounting for the machine gun used for defence against enemy airplanes. When the guns for the newly dug pits arrived it was discovered that only

field carriages had been provided. These were unsuitable for aircraft defence work, so swivels were constructed from old motor truck springs. These improvised mounts are said to be as good as any used.

Worst Conditions Yet Experienced.—Icy roads turned into river beds, for torrential streams flowing from the melting snows on the hills, together with a downpour of fine rain, combined to make conditions the worst the American Army has experienced since crossing to France.

Through the zone of the army is was not infrequent to find the roads at places lined on either side with motor trucks which had been ditched. Mule-driven vehicles also were mired in many cases. In one stretch of road a mile long there were 14 vehicles ditched at night with the soldiers working hard to release them. The mule-drawn transport trains, indeed, suffered the most from the conditions, the animals slipping on the icy road beds and being unable to arise after falling until branches and twigs cut from trees were put under their feet.—*Washington Evening Star,* 16/1.

GOETHALS AS ACTING QUARTERMASTER GENERAL.—Reorganization of the War Department, begun with the creation last month of the War Council of high general officers, advanced a step further, January 7, with the appointment by Secretary Baker of Major General George Goethals, acting quartermaster general, to serve also as director of War Department transportation and storage. Wide economies in the use of cars and in shipping charges are expected from this centralization in one agency of functions heretofore exercised by five departmental bureaus independently.

Behind the announcement stands the probability that army purchasing also will be drawn together under a central control. Steps to this end are under consideration, but legislation may be required to carry it out. The question of finding a man for the job, however, already has been taken up. Some officers think the duty should be placed under the General Staff, but others believe a separate office should be created, to be filled by a civilian of national reputation for business ability. It is practically certain, however, that should a civilian be appointed he would be commissioned as a general officer, subject to all army law.

General Goethals, as acting quartermaster general, directs the supply, subsistence and pay departments of the army, supplemented by the embarkation and other services already established in his office, each with a general officer in charge. Under to-day's order he will, in addition, supervise transportation of all ordnance, engineer, signal corps, aviation service and coast artillery material, as well as quartermaster supplies and troops.

All bureaus heretofore independent in this regard have been directed to co-ordinate their demands upon the railroads and upon storage facilities through the director of transportation. He, in turn, will deal with the director of the railroads, the Shipping Board, or any other centralized agency for transportation or storage, presenting complete schedules of cars and tonnage needed, and working out routing and storage so as to get the most efficient use of the nation's facilities.—*Baltimore American,* 8/1.

AMERICAN FLIER DOWNS GERMAN AERO AT FRONT.—The former captain of the Princeton football team, now serving in the flying corps, brought down his first German plane, January 5, says the European edition of the *New York Herald.—Washington Evening Star,* 9/1.

DIFFICULT TO TRANSFER TO UNCLE SAM'S FORCES.—The Associated Press has received information that the American War Department has decided on rules governing the transfer of Americans serving with the British forces to the American Army, by which their present status will not be disturbed except in special cases, and where the transfer "is plainly in the interests of the United States."

This decision, it is said, was reached on the following grounds:

First, that Americans who enlisted with the British forces must have been prompted by patriotic motives to do so and that therefore it does not

matter whether they remain British or are transferred to their own flag, since they would be fighting for the same cause.

Second, in some cases, particularly with the Canadians, many of whom are Americans, transfers might seriously disorganize units.

Americans in Canadian Forces.—While no official statistics are available, it is fair to guess that there are at least from 25,000 to 30,000 Americans in the Canadian forces alone, and perhaps half as many more scattered through other British contingents in France, Mesopotamia, Palestine, and elsewhere. Hundreds of letters have been sent to the American authorities in London begging for transfer, but the authorities say they are unable to make concession to any special number of men without taking over the men as a whole.

In many instances, it is pointed out, the desires for transfers are not prompted by patriotism, but because of the chance to enjoy greater benefits and the higher pay of the American forces. The authorities argue that if in the first instance the men joined the British Army "to fight for principle," the principle is not changed if they remain with the British forces. Hence it has been decided that an officer in the British Army, who is an American and desires a transfer, must apply to the embassy in London, which will be guided in the premises by instructions from the War Department at Washington.

Hard to Obtain Transfer.—The rules adopted say that "it will not be the general policy of the War Department to request the release of an American holding a commission in a foreign service." Regarding enlisted men, the new rules say that release will only be considered of applicants who present themselves personally to the military attaché of the American embassy in London "with satisfactory documentary evidence of citizenship," and that the military attaché "may then, in special cases, ask for release." The rules add: "When so released, me nare to proceed to France at their own expense and report for enlistment in our service to the headquarters of the American expeditionary force."

The rules provide that an enlisted man must also procure from the commander of his unit of the British forces a written recommendation that the commander regards his transfer to the American forces "in the interest of the United States."—*Washington Evening Star,* 5/1.

SAFEGUARD MUNITION SHIPS.—The danger of destruction in New York City by the explosion of a munition ship, such as occurred at Halifax, is being done away with by the adoption of new routes for handling such ships and new points for loading their barges and lighters, it was announced by government officials.

The new plan was worked out by the War Board of the Port of New York and army engineers. The menace to South Brooklyn, now present while munition ships are loaded in Gravesend Bay, is to be ended by moving the ships to a point where, even if an explosion did occur, the destruction on land would be comparatively slight. The ships will hereafter be loaded at a point too distant to endanger any part of the city. The route of barges and lighters carrying munitions on the bay has been fixed so that Manhattan Island and Brooklyn are said to be almost entirely free from danger, while no important points on the New Jersey shore of the bay are greatly menaced.—*N. Y. Times,* 10/1.

GENERAL NOTES

WHY GERMANY IS LOSING THE WAR.—Germany is the backbone of the Central Powers' military organization. Shatter her, and the whole fabric of the enemy's opposition falls to the ground. Because of this fact, France, Great Britain, and now the United States have massed their strength in France and Flanders. For the same reason Germany has maintained in

France and Flanders two-thirds of her total forces. To-day she has practically the whole of her armies—or what is left of them—on the western front and in Italy.

How may Germany be beaten?

In the early days of the war, when her armies were at their full strength, it was believed that the breakdown would come within her borders. We all remember the familiar predictions of 1915 and 1916. She was to suffer financial collapse; lacking cotton, nitre and copper, she would be unable to munition her vast armies; lacking food, she would starve.

Yet, to-day, with the fourth year of the war half spent, the German people are not starving for food; her armies are not starving for munitions; nor is she bankrupt, not at least in the eyes of her own people.

But, as year after year of the war passed by, it began to be realized that there was yet another menace to German success; a menace purely military in nature, remorseless in its approach, and absolutely fatal when it arrived—the menace of a shortage of man-power.

To-day, among all military men and among those civilians who have managed to maintain a true perspective of this vast war, it is known that the backbone of German resistance will be broken when the wastage of man-power—rifle-bearing man-power—has reached the point where it is no longer possible to man the battle front in sufficient strength to hold back the enemy.

This wastage and the ultimate arrival at the point of man-exhaustion are a mere question of mathematics—of addition and subtraction; the result is as certain as that water will not run up hill, or that the whole is greater than its part.

Of the four great necessities referred to, failure of any one of which would bring Germany down, the first three may be likened to a constantly-flowing river—the last to a reservoir of definite capacity. There is a certain amount of uncertainty as regards the first three—but the last, unless Germany can gain an early military decision, spells her certain and hopeless defeat.

You may carry the bucket to the stream as often as you like; but dip your bucket in the cistern too often and one day you shall find it dry.

To no one are these facts so well known as to the German staff; and no part of the German propaganda has been so cleverly handled as that which is designed to camouflage that human cistern, the contents of which have been drained away so swiftly as the war has run its course.

"Look at the map," cries von Hollweg.

"Look at the cistern," we answer; and with our eyes on that annual loss of one and a quarter million German fighting men who will never again shoulder a rifle, we care very little whether the blood-letting be done a little to the east or a little to the west of a line traced on a map.

As to the bankruptcy of Germany it can never happen so long as the Kaiser has a printing press to turn out a cataract of paper-money, and the German citizen is content to accept the output at its face value.

Nor will Germany fail to supply all the munitions that her rapidly-dwindling armies can use. She can dig coal and iron ore from her mines and coax nitrogen from the atmosphere for guns, shells and explosives—and keep on doing it indefinitely. The Serbian mines and the kitchen of the *hausfrau* will give their yield of copper. The stream will flow in sufficiency as long as the war shall last.

Food? There is enough arable land within the battle-lines to raise sufficient food to keep the citizen alive and provide a special ration for the man at the front.

Men? Before this war, military writers, the Germans included, told us that the proportion of the population in any country that could be made into fighting men was 10 per cent. The population of Germany is 68,000,000. As a matter of the fact the mobilization has reached nearly 15 per cent,

and therefore in August, 1914, the potential fighting strength of Germany was about 9,500,000 men.

This was the reservoir from which the human material would have to be fed to the fighting lines. The nine and one-half million fighting men could never be affected by the birth rate—not unless the war should run for 18 years. The only supply available to offset the outflow was the physically efficient young men, some 450,000 who would reach the age of 18 each year. Unlike the question of paper money, or munitions or food, there is no process by which men can be printed in a printing press or fabricated in smelter, rolling mill and lathe. Nor can you dig up fighting men from the ground, like potatoes.

And not even the German chemists could make a substitute for human flesh and blood—though they probably dreamed even of that.

So there it stood at the beginning of the war, a cistern full to the brim with 9,500,000 men with a potential annual inflow of 450,000.

Now let us see what has been the rate of loss. There are two ways in which we may get at the facts: first the German official statements; second, the estimates made by the Allied Military Intelligence Departments (secret-service). And we find that these arrive at the same total loss—dead and hopelessly crippled—of about 5,000,000 men.

For the first two years Germany gave out official figures—doctored of course. But the Allies, through their secret-service agents in Germany, gathered the true figures by tabulating the notices sent to the relatives of the dead, and recorded on the roll of honor of churches, clubs, labor unions, etc. This revealed that about 1,150,000 men had been killed or taken prisoners, and reckoning the hopelessly crippled at 1,350,000 men, which is about the ratio of cripples to dead as determined in this war, we get a loss of 2,500,000 in the first two years and a total loss of about 5,000,000 men by August, 1918.

General Maurice, replying recently to General Ludendorf's statement that the British in making their slight gains in Flanders, this year, had lost 500,000 men, stated that they had never that number engaged on the sector in question. He stated, further, that they had accurate knowledge that the German losses had been 75 per cent greater than those of the British.

There is nothing surprising in this statement. Not only have the British a great superiority in gunfire—as have the French—with superior observation by aeroplane, but the Germans have frequently made a dozen or more counter attacks in close order during the furious fighting on the Somme and before Ypres. Their losses must necessarily be enormous.

Now the British losses as officially reported have been running as high as 30,000 a week. Eighty per cent of these, at least, or 24,000, must have occurred on the western front. During the winter months the losses have averaged about 10,000 per week. This gives an average for the year of 17,000 per week on this front.

Increasing this by 75 per cent gives a German loss on the British front of 29,750 per week.

Their losses to the French at such battles as the Marne, Champagne, Verdun, the Chemin-des-Dames, cannot be less—they may indeed be more.

The terrific fighting on the Russian front coupled with the Serbian, Roumanian and Italian drives may readily have resulted in average casualties of say 26,000 per week among the Germans.

The total average casualties on all fronts then would reach 85,500 per week. This would mean a total of 4,446,000 casualties in one year.

Now at the ratio of five wounded to one dead this would give a total of 741,000 dead per year.

The Germans have made some fantastic claims as to the number of wounded that are returned to full active service—claims of well over 90 per cent. If 76 per cent are so far restored that they can carry a rifle and endure the frightful ordeal of trench fighting it would a notable result. Assuming 76 per cent so restored, we find that of the wounded, 889,200 are permanently crippled and rendered unfit.

But there is yet another leak in this cistern of man-power, which curiously is always overlooked. We refer to the fact that soldiers die from sickness as well as civilians. Our census of 1910 shows that the average death rate between the ages of 20 and 45 is about eight per thousand. The damp conditions of trench life, coupled with the extraordinary mental strain of modern warfare, will raise the rate above that of American civilian life, especially as undeveloped boys of 16 years and men up to 45 years of age are found in the German army. Assuming a rate of 10 per thousand, the loss through sickness would reach 68,000 per year. This figure would probably be maintained, because though the total army has decreased the quality of the troops has greatly deteriorated.

A summary of these totals for killed, permanently crippled, and dead through sickness, gives a yearly total of 1,698,200 men absolutely lost. To compensate for this Germany calls to the colors each year about 450,000 young men; not 600,000, which is a figure they give out for public consumption. The total annual loss therefore is 1,248,200. And if this rate be maintained until August, 1918, the total net loss will be 4,992,800 or say 5,000,000 men.

This it will be noted agrees with the total loss, as determined by the allied secret-service from the official notifications made by the government to the relatives of soldiers lost at the front.

Therefore we repeat, "Look at the cistern, not at the map."—*Scientific American*, 15/12.

BIG KRUPP PLANT AT ESSEN ABLAZE.—Workmen from Essen, Germany, say that the Krupp plant, the great German munitions establishment, has been ablaze for 24 hours.

The plant at Essen, the main establishment of the Krupps, the largest manufacturers in Germany of arms and munitions, employed about 30,000 men before the war. It has been expanded greatly during the war. Facts relating to its present size and the number of workmen are kept secret by the German Government. It was reported unofficially in October of last year that about 70,000 persons, including several thousand women, were at work there and that 20,000 were to be added to the force.

Early this year there was a strike at the Krupp works, said to have been due to lack of food. It was reported that 40,000 workers were involved and that the authorities combatted it by sending many of the men to the front, but little authentic information was permitted to come out of Germany.

Essen is in Rhenish Prussia about 40 miles from the Dutch border. Few places in Germany are guarded more carefully. No persons unknown to the German authorities are permitted to go to the town. The plant has been raided several times by French and British airmen, notwithstanding its formidable anti-aircraft defences. Press dispatches last July said 100 persons there had been killed in a raid by French airplanes and that considerable damage had been done to the works.

Krupps Quadruple Their Navy Plant.—The Krupps recently have quadrupled their naval plant near Kiel, according to a dispatch from Berlin by way of Berne to *La Suisse*. This was done at the request of the Gergan Government for the purpose of making up losses in submarines, which, the dispatch adds, have been heavier than the German Admiralty admits.—*N. Y. Herald*, 23/12.

GIVE PAROLE INSTEAD OF BECOMING PRISONERS.—Commanders of German submarines now usually require the captains of merchant ships to give their parole instead of making them prisoners as heretofore, according to the annual report of the London-America Trading Company, a large British shipping concern. When men are paroled they cannot re-enter the merchant marine during the war. The companies employing them give them half pay until they obtain other employment.

"We have several ship captains in our employ who have sunk more than one German submarine, and a good many of our ships have had scraps with the enemy the past year," says the report. "Some have come home with holes in their funnels or sides, and others have failed to return. But when a ship has been torpedoed and gone down, the survivors hurry back to the offices of the firm, make a hasty report and then ask cheerily, 'When is the next ship to be ready?' That is the spirit of the mercantile marine."—*Washington Star*, 28/12.

TORPEDO MAKER HELD AS TRAITOR.—Paul Hennig, a German-born American citizen, for many years a petty officer in the Imperial German Navy, and who for the last five years has been foreman of the gyroscope department of the E. W. Bliss Torpedo Company in Brooklyn, was indicted on Friday as a traitor to the United States by a federal grand jury of the Eastern District of New York. The indictment is the first to be returned in New York City for treason since Congress declared war on Germany, and in the event of conviction the death penalty may be imposed. The offence charged is that Hennig tampered with the delicate gyroscope mechanisms in such a way as to render the torpedoes to which they were fitted imperfect, if not useless, after being discharged from the torpedo tubes of an American destroyer or submarine.

Hennig is about 43 years of age, and has been in the United States since 1908. Prior to coming to this country he was, according to the federal authorities, for a long period on duty at the German torpedo base at Kiel. He is described as a man of fine education and as an expert in everything that pertains to gyroscopes, particularly such as are used at the present time to control the movement of torpedoes after they are fired and while they are speeding toward their mark. He is himself the inventor of a gyroscopic attachment for torpedoes, which, it was said, has considerable merit.

It was stated in the Brooklyn Federal Building that about 90 Germans had been taken out of the Bliss Company works in the last few weeks. More than 80 enemy aliens who had been employed since war was declared in the Bliss works are now in internment camps. One of the men taken from the works several weeks ago was Karl Hennig, the 23-year-old son of the man indicted as a traitor on Friday. He was born in Germany of a German mother and came to this country with his father in 1908.—*N. Y. Times*, 30/12.

BRITISH PRISONERS HELD BY THE ENEMY total 46,712, of which 2257 are officers and 44,455 enlisted men. These prisoners include members of the regular army, territorial forces, Royal Navy and navy division.—*N-Ac Log*, 10/1.

GERMANY RUSHING MEN TO WESTERN FRONT.—The Berlin *Vossische Zeitung* states that Field Marshal von Hindenburg and General von Ludendorff arrived in Berlin Saturday morning, apparently for a new Crown Council. An official statement adds that the Crown Prince was also in Berlin and was received Saturday morning by the Kaiser.

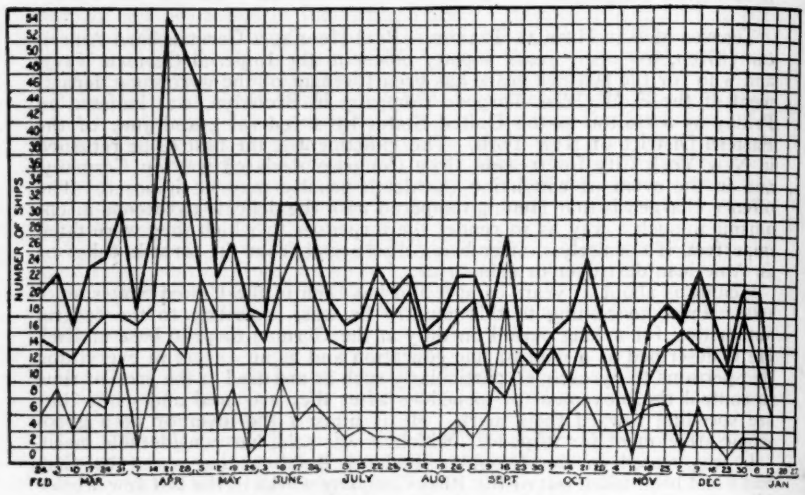
This journey of the Crown Prince to Berlin appears sudden, as he was at Aix-la-Chapelle Friday night, according to a prisoner's statement, apparently intending to await the arrival of German repatriated prisoners.

In some quarters to-night it is suggested that the Crown Council is connected with the expected western offensive. Attention is drawn to the fact that German troop trains are still running westward day and night. Only thoroughly fit men are carried through, weaklings or men showing any sign of unfitness being dropped at Red Cross stations on the way.—*N. Y. Times*, 18/1.

GERMANS DESTROY VILLAGES, MOSTLY NEAR ST. QUENTIN, AS A DEFENSIVE MEASURE.—The Rome correspondent of the *Matin* says that by order of Field Marshal von Hindenburg, according to reliable information which

has reached him, 130 villages behind the western front, mostly in the region of St. Quentin, have been leveled to the ground, so as to afford better oportunity for defence of the German lines to the rear.

Notwithstanding denials, the correspondent adds, only one-third of the 300,000 Belgians deported to Germany have been permitted to return to their homes.—*Evening Star*, 9/1.



BRITISH MERCHANT SHIPS SUNK.

Heavy Line.—Total.
Medium Line.—Over 1600 tons.
Light Line.—Under 1600 tons.

LOSS OF MERCHANT TONNAGE.—According to figures supplied by the Patriotic Education Society, Inc., Washington, D. C., the loss of world's tonnage up to September, 1917, actually amounted to 12,000,000 tons, although the destruction by submarine and mine was only 8,783,080 tons. This is figured by estimating the unusual depreciation due to the exigencies of war and including the ships that are held in port, as well as the falling off in the world's tonnage. If the war had not intervened, it is estimated that the world tonnage in 1917 would have been about 59,000,000 gross tons.—*Marine Engineering*.

DESTRUCTION OF BIG CHEMICAL PLANT STAGGERING MILITARY BLOW TO KAISER.—From a well-informed source the *Daily Telegraph* has received interesting particulars of the great explosion of November 22, by which the large chemical factory of Griesheim-Elektron, near Frankfort, was destroyed. No details were obtainable at that time, and no great attention was paid to the report in this country, no doubt from desire to avoid exaggeration of what might, after all, prove to have been an affair of no great importance. But the extreme care taken to prevent fuller accounts from getting out of Germany and the enforced silence of the German press on the subject, are the best proof of the German Government's anxiety to conceal a serious loss.

The first telegram to escape from Frankfort made a significant admission, which the subsequent silence only confirms. It announced that the excite-

ment in Frankfort caused by the explosion was tremendous. Information which has since been obtained makes it clear that there was good reason for excitement.

Like Military Defeat.—For it is now certain that the explosion caused the complete destruction of one of the greatest munitions factories in the world, by which Germany has suffered a disaster comparable to a serious military defeat in its effect on the issue of the war.

Under these circumstances it is a matter of supreme interest to understand precisely to what extent German military equipment was dependent on the source of supply which was wiped out.

The Griesheim factory was situated in the neighborhood of Frankfort, with an extensive frontage on the River Main. It consisted of an enormous group of buildings covering an area of more than 54 acres. Twenty-eight large chimneys, one of them higher than 200 feet, gave the impression more of an industrial town than a single factory, and numerous piers abutting on the river, combined with an extensive railway system, enabled the huge concern to distribute its product economically and quickly. Before the war it ranked as fourth in importance of the great German chemical works, and was always a flourishing company, paying a pre-war dividend of 14 per cent, and worth as a going concern more than 60,000,000 marks (£3,000,000).

Great Munitions Plant.—Its commanding position in the chemical world rested not only on its huge output but on the extensive variety of its manufactures. These comprised, among other things, aniline dyes of every description, nitric, sulphuric and other acids, phosphorus and alkali, with liquid chlorine, hydrogen and oxygen, as important by-products. What it meant to Germany as a source of munitions of war can thus be readily understood.

As one of the uncommon instances among German chemical works possessing installations of electro-chemical production, it was of prime importance as a source of synthetic nitrates, and its splendidly organized research laboratory enabled it to play a leading part in the production of poison gas and the other more refined forms of "frightfulness" which Germany has introduced in the course of the war. That the Imperial Government has taken the fullest advantage of these facilities is shown by the rapid increase of the works both in extent and output since the beginning of the war, and by the fact that the company has recently decided to increase its share capital by 50 per cent, an increase in which the German Government is more than suspected of having a financial interest.

Supplied Explosives Factories.—With regard to the productive capacity of Griesheim, some authoritative facts are available which cast an interesting light on the war activities of this concern. It has been producing saltpetre for the manufacture of black powders at the rate of 1000 tons a day, and it is reputed to be the only factory turning out this article. To such an extent has its already impressive output of soda nitrate and concentrated sulphuric acid been developed, that it supplied the whole demand of five nitroglycerin and dynamite factories, as well as two powder works, including that of Rottweil, one of the most important in Germany. Another explosive, which it manufactured in large quantities, was tontine, through its facilities for making synthetic phenol and consequently picric acid, from which acid this explosive is derived.

Another circumstance of special interest to us is the fact that this factory supplied large quantities of electrolytic hydrogen for the inflation of Zeppelins, and possessed by way of a reserve gasometers with a total capacity of more than 300,000 cubic feet. So important was it in this respect that a Zeppelin shed, usually containing two or three airships, was erected close to the works. For the balloons at the front the gas was supplied in steel tubes in the liquefied state.

Made Poison Gases.—Moreover, the extensive electrolytic plant was further utilized to produce asphyxiating gas, and lachrymatory and poisonous shells. Indeed, it was the greatest center of this manufacture in Ger-

many, and in 1916 the output of poison gases reached the colossal figure of nearly 900,000 cubic feet a day.

The extent of the material loss which Germany has suffered by the destruction of the Griesheim factory can thus be easily comprehended. But the disaster is of still wider significance. The variety of the materials formerly produced means, in such a closely interlocking industry as chemical manufacture, that every concern in Germany is affected, both from the cutting off of supplies, which many of them formerly drew from Griesheim, and from the necessity of making the loss of those supplies good from plants already working to their maximum.

The deaths of scores of trained workmen and specialists in the factory itself and in the dwellings within its confines will make the task of coping with the deficit all the more difficult. Even if the material loss can be successfully replaced, the problem of collecting miscellaneous quantities of explosives and acids from various quarters and conveying them over the greater distances thus made necessary is bound to complicate further the transport difficulty already regarded exceedingly pressing in Germany. It is impossible that the works can be reconstructed during the war, and sooner or later Germany must show on her fighting fronts the effects of this staggering blow which she has suffered within her own territory.—*Washington Post*, 6/1.

WAR RATIONING IN ENGLAND.—The cablegram of January 6 from Lord Rhondda describing the food situation in both England and France as "critical and anxious," seems to be at variance with what he said in an address at Silverton three days earlier: "There is nothing alarming in the situation. You have only to tighten your belt. The people of this country are undergoing nothing like the privations in Germany. There they have less than a pound of meat a week." It will not do to jump to the conclusion that the British Food Controller was an alarmist in the one case and an optimist in the other. His cablegram to Mr. Hoover reflects a belief that lean days are coming for the people of the British Isles; the speech at Silverton, if read between the lines, has very much the same significance; in both, compulsory rationing is declared to be necessary.

The policy of restricting and regulating the consumption of food will be entered upon with reluctance, for in Germany the authorities will seize upon British rationing as evidence of greater privation than the German people are called upon to endure, and the appeal will be made to tighten the belt a little more to win the war. It will be said exultantly that the British have been reduced to extremity by the success of the submarine campaign. The truth is that while foods, particularly meat, are none too plentiful in Great Britain and France and prices are high and advancing, want as the people of Germany and Austria know it does not exist. In France the cost of living has increased 100 per cent since the beginning of the war, and prices are now about double those prevailing in New York for eggs, butter, mutton, bacon and pork, and rice. Canned goods are scarce and higher. Potatoes and milk sell for about the prices asked here. In England foods are a little cheaper than in Paris.

For whatever shortage exists in Great Britain the people are in part to blame. They have been urged again and again to economize, but the response has not been what the government expected. The workers have been earning much higher wages in munition making and other war industries than they received before the war; and the truth is they have lived high, for them. There has been more sacrifice in the middle class than among the artisans and unskilled laborers. Probably from every point of view the gentry and aristocracy have made the most sacrifices in their habits of life as well as in money contributions to the war. The British people cannot eat their cake and have it. So compulsory rationing has become inevitable. Lord Rhondda sees "long queues of people waiting in

severe weather in practically every town in England for the necessaries of life."

At the same time the ration plan is not to be comprehensive all at once, which means that the tight belt is for the present a figure of speech. First, meat will be conserved and given out in portions; then the turn of butter and margarine will come; and periodically, if the situation does not improve, other necessaries will be added to the list. As a matter of fact, compulsory rationing, as contrived by Lord Rhondda, is a long look ahead. The American people will be shortsighted if they do not read a lesson from the regulated subsistence to which the British are now to be reduced because they failed to take the warnings of their Food Controller seriously.—*N. Y. Times*, 8/1.

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1 submarine 435

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DIPLOMATIC NOTES

From December 18 to January 18

PREPARED BY

ALLAN WESTCOTT, PH. D., Instructor, U. S. Naval Academy

RUSSO-GERMAN PEACE NEGOTIATIONS

FIRST MEETING AT BREST-LITOVSK.—On December 23 representatives of the Central Powers and the Bolshevist Government in Russia met at Brest-Litovsk to negotiate peace. The delegates were as follows:

Germany: Dr. Richard von Kühlmann, Foreign Minister; Herr von Rosenberg, Baron Von Hock, General Hoffmann, and Major Brinckmann.

Austria-Hungary: Count Czernin, Foreign Minister; Herr von Merey, Freiherr von Wisser, Count Collerda, Count Osaky, Field Marshal von Chisceries, Lieutenant Polarny, and Major Von Gluise.

Bulgaria: Minister Popoff, Former Secretary Cosseff, Postmaster General Stoyanovich, Colonel Gantjiff, and Dr. Anastasoff.

Turkey: Former Minister of Foregn Affairs Nessimy Bey, Ambassador Hakki, Under Foreign Secretary Hekmit Bey, and General Zekki Pasha.

Russia: Joffe Kamineff, Bisenko Pokrosky, Karaghan Lubinski, Weltman Pawlowich, Admiral Altvater, General Tumorrl, Colonel Rokki, Colonel Zeplett, and Captain Lipsky.

Prince Leopold of Bavaria, as Commander-in-Chief of the German forces in the east, welcomed the delegates and invited Hakki Pasha, as the senior delegate, to open the conference. Hakki Pasha, after an expression of a desire for a satisfactory result, declared the negotiations formally open, and proposed Dr. von Kühlmann as the presiding officer. The German Foreign Minister was unanimously elected chairman.

The German Foreign Minister proposed the following rules, which were adopted:

"Questions of precedence will be decided according to the alphabetical list of the represented powers.

"Plenary sittings will be presided over by the chief representative of each of the five powers in rotation.

"The following languages may be used in the debate: German, Bulgarian, Russian, and Turkish.

"Questions interesting only part of the represented powers may be discussed separately.

"Official reports of the proceedings will be drafted jointly."

At von Kühlmann's suggestion the chief Russian delegate stated the chief principles of the Russian peace program in a long speech, which coincided on the whole with the well-known resolutions of the Workmen's and Soldier's Deputies.

The delegates of the Central Powers declared their readiness to begin the examination of the Russian program. The result of their labors will be discussed at the next sitting.

COUNT CZERNIN'S TERMS FOR GENERAL PEACE.—On December 25 Count Czernin, speaking for the Central Powers, offered a statement of terms involving no "forcible annexations" and no indemnities. Since the Central Powers stipulated a general acceptance of these terms on the part of

Russia's allies, the Russian delegates requested a 10-day recess to consider the terms and present them to the Western Powers. Count Czernin's statement was as follows:

The delegations of the allied (Teutonic) powers, acting upon the clearly expressed will of their governments and peoples, will conclude as soon as possible a general peace. The delegations, in complete accord with the repeatedly expressed viewpoint of their governments, think that the basic principles of the Russian delegation can be made the basis of such a peace.

The delegations of the Quadruple Alliance are agreed immediately to conclude a general peace without forcible annexations and indemnities. They share the view of the Russian delegation, which condemns the continuation of the war purely for aims of conquest.

The statesmen of the allied (Teutonic) governments in programs and statements have emphasized time and again that for the sake of conquest they will not prolong the war a single day. The governments of the allies unswervingly have followed this view all the time. They solemnly declare their resolve immediately to sign terms of peace which will stop this war on the above terms, equally just to all belligerents without exception.

It is necessary, however, to indicate most clearly that the proposals of the Russian delegation could be realized only in case all the powers participating in the war obligate themselves scrupulously to adhere to the terms, in common with all peoples.

The powers of the Quadruple Alliance now negotiating with Russia cannot, of course, one-sidedly bind themselves to such terms, not having the guarantee that Russia's allies will recognize and carry out these terms honestly without reservation with regard to the Quadruple Alliance. Starting upon these principles, and regarding the six clauses proposed by the Russian delegation as a basis of negotiations, the following must be stated:

CLAUSE 1. Forcible annexations of territories seized during the war does not enter into the intention of the allied powers. About troops now occupy-seized territories, it must be stipulated in the peace treaty, if there is no agreement before, regarding the evacuation of these places.

CLAUSE 2. It is not the intention of the allies to deprive of political independence those nations which lost it during the war.

CLAUSE 3. The question of subjection to that or the other country of those nationalities who have not political independence cannot, in the opinion of the powers of the Quadruple Alliance, be solved internationally. In this case it must be solved by each government, together with its peoples, in a manner established by the constitution.

CLAUSE 4. Likewise, in accordance with the declaration of statesmen of the Quadruple Alliance, the protection of the rights of minorities constitutes an essential component part of the constitutional rights of peoples to self-determination. The allied governments also grant validity to this principle everywhere, in so far as it is practically realizable.

CLAUSE 5. The allied powers have frequently emphasized the possibility that both sides might renounce not only indemnification for war costs, but also indemnification for war damages. In these circumstances every belligerent power would have only to make indemnification for expenditures for its nationals who have become prisoners of war, as well as for damage done in its own territory by illegal acts of force committed against civilian nationals belonging to the enemy. The Russian Government's proposal for the creation of a special fund for this purpose could be taken into consideration only if the other belligerent powers were to join in the peace negotiations within a suitable period.

CLAUSE 6. Of the four allied powers, Germany alone possesses colonies. On the part of the German delegation, in full accord with the Russian proposals regarding that, the following is declared:

The return of colonial territories forcibly seized during the war constitutes an essential part of the German demands, which Germany cannot

renounce under any circumstances. Likewise, the Russian demand for immediate evacuation of territories occupied by an adversary conforms to German intentions. Having in view the nature of the colonial territories of Germany, the realization of the right of self-determination, besides the above outlined considerations, in the form proposed by the Russian delegation is at present practically impossible.

The circumstance that in the German colonies the natives, notwithstanding the greatest difficulties and the improbability of victory in a struggle against an adversary many times stronger and who had the advantage of unlimited import by sea, remained in the gravest circumstances faithful to their German friends, may serve as proof of their attachment and their resolve by all means to preserve allegiance to Germany, proof which by its significance and weight is far superior to any expression of popular will.

The principles of economic relations proposed by the Russian delegation in connection with the above six clauses are approved wholly by the delegations of the allied powers, who always have denied any economic restrictions, and who see in the re-establishment of regulated economic relations which are in accord with the interests of all people concerned, one of the most important conditions for bringing about friendly relations between the powers now engaged in war.

GERMANY'S SPECIFIC TERMS.—On returning from Brest-Litovsk on January 1 the Russian delegation presented the specific terms of the Central Powers as given at the conference. Russia objected to these terms chiefly on the ground that, according to Article I, Germany refused to evacuate Riga, Libau, and other parts of Russia until all elements in Russia had accepted the treaty; and that, as stated in Article II, Germany refused to move troops from Poland, Lithuania, Courland, and portions of Esthonia and Livonia, and considered that as these territories had already declared for independence, no further vote was necessary. The German terms were in substance as follows:

ARTICLE I. Russia and Germany are to declare the state of war at an end. Both nations are resolved to live together in the future in peace and friendship on condition of complete reciprocity. Germany will be ready as soon as peace is concluded with Russia and the demobilization of the Russian armies has been accomplished to evacuate her present positions in occupied Russian territory, in so far as no different inferences result from Article II.

ARTICLE II. The Russian Government, having, in accordance with its principles, proclaimed for all peoples, without exception, living within the Russian Empire, the right of self-determination, including complete reparation, takes cognizance of the decisions expressing the will of people demanding a full state of independence and separation from the Russian Empire for Poland, Lithuania, Courland, and portions of Esthonia and Livonia. The Russian Government recognizes that in the present circumstances these manifestations must be regarded as an expression of the will of the people, and is ready to draw conclusions therefrom. As in these districts to which the foregoing stipulations apply, the question of evacuation is not such as provided for in Article I, a special commission shall discuss and fix the time and other details in conformity and in accordance with the Russian idea of the necessary ratification by a plebiscite on broad lines and without any military pressure whatever of the already existing proclamation of separation.

ARTICLE III. Treaties and agreements in force before the war are to become effective if not directly in conflict with changes resulting from the war. Each party obligates itself, within three months after the signing of the peace treaty, to inform the other which of the treaties and agreements will not again become effective.

ARTICLE IV. Each of the contracting parties will not discriminate against the subjects, merchant ships or goods of the other parties.

ARTICLE V. The parties agree that with the conclusion of peace economic war shall cease. During the time necessary for the restoration of relations there may be limitations upon trade, but the regulations as to imports are not to be of a too burdensome extent and high taxes or duties upon imports shall not be levied. For the interchange of goods an organization shall be effected by mixed commissions to be formed as soon as possible.

ARTICLE VI. Instead of the commercial treaty of navigation of 1894-1904, which is abrogated, a new treaty will accord new conditions.

ARTICLE VII. The parties will grant one another during at least 20 years the rights of the most favored nation in questions of commerce and navigation. [This clause is apparently that carried in a German wireless message received in London and sent by cable on December 31.]

ARTICLE VIII. Russia agrees that the administration of the mouth of the Danube be intrusted to a European Danube commission, with a membership from the countries bordering upon the Danube and the Black Sea. Above Braila the administration is to be in the hands of the countries bordering the river.

ARTICLE IX. Military laws limiting the private rights of Germans in Russia and of Russians in Germany are abolished.

ARTICLE X. The contracting parties are not to demand payment of war expenditures, nor for damages suffered during the war, this provision including requisitions.

ARTICLE XI. Each party is to pay for damage done within its own limits during the war by acts against international law with regard to the subjects of other parties, in particular, their diplomatic and consular representatives, as affecting their life, health or property. The amount is to be fixed by mixed commissions with neutral chairmen.

ARTICLE XII. Prisoners of war who are invalids are to be immediately repatriated. The exchange of other prisoners is to be made as soon as possible, the times to be fixed by a German-Russian commission.

ARTICLE XIII. Civilian subjects interned or exiled are to be immediately released and sent home without cost to them.

ARTICLE XIV. Russian subjects of German descent, particularly German colonists, may within 10 years emigrate to Germany, with the right to liquidate or transfer their property.

ARTICLE XV. Merchantmen of any of the contracting parties which were in ports of any other party at the beginning of the war, and also vessels taken as prizes which have not yet been adjudged, are to be returned, or if that be impossible, to be paid for.

ARTICLE XVI. Diplomatic and consular relations are to be resumed as soon as possible.

NEGOTIATIONS RENEWED.—On January 3 Count von Hertling announced to the Reichstag that Dr. von Kühlmann had been instructed to reject Russia's proposal to transfer the conference to Stockholm, on the ground of difficulty of telegraphic communication with the capitals of the nations engaged and danger of interference from Russia's allies. Concerning Russia's rejection of the proposals relating to occupied territories, the Chancellor said: "We can cheerfully await the further course of this incident; we rely on our strong position, our loyal intentions, and our just rights." The decision to reject the Stockholm proposal was approved on January 4 by all parties in the Reichstag Main Committee save the Radical Socialists.

Sessions were renewed at Brest-Litovsk on January 8. Owing to failure of Russia's allies to take favorable action Germany withdrew the terms

offered in Count Czernin's statement of December 25. Dispatches of January 15 stated that the armistice had been extended to February 18, and that the peace conference had been adjourned to be continued later. In the session of January 11 difficulty arose over the Russian request that deported Poles and Lithuanians should be allowed to return, and that imprisoned Czechs and Bohemians in Austria should be liberated.

GERMAN PEACE ENVOYS HOLD DIVERGENT VIEWS.—Arthur Ransome, the Petrograd correspondent of *The Daily News,* sends the following under date of January 3:

"From a source which has hitherto proved reliable I learn the following suggestive details concerning the peace negotiations. Two perfectly distinct tendencies were noticeable in the enemy delegation, one annexationist, represented by General Hoffmann, the other more moderate, represented by Dr. von Kühlmann and Count Czernin. There were frequent disputes between these two tendencies, settled in each case by an appeal to Berlin. Berlin, without exception, supported Czernin and Kühlmann. Hoffmann takes a purely military view, and more than once complained with great bitterness of the Russian use of the armistice to agitate among the German soldiers."—*N. Y. Times,* 5/1.

SEPARATE PEACE WITH BULGARIA.—London, January 10.—A separate peace agreement has been signed by Russia and Bulgaria, according to the *Bund* of Berne, a dispatch from the Swiss capital reports. A Bulgarian correspondent says Premier Radoslavoff read the following dispatch from Brest-Litovsk in Parliament:

"War between Russia and Bulgaria ceases. Diplomatic and economic relations between Russia and Bulgaria are resumed. Russia recognizes Bulgaria's right to nominate a delegate to an international Danube commission. The first peace is thus concluded, with the consent of Bulgaria's allies."

Separate peace proposals made by Turkey have been refused by the Bolshevist Government, according to a report in Petrograd. Turkey was requested to participate in the general conference between Russia and the Central Powers.

A dispatch of January 5, from Petrograd, purported to give the Turkish peace terms as presented to Russia. Among the terms proposed by Turkey were free passage of the Dardanelles for Russian ships, Russian evacuation of Turkish territory, and demobilization of the Russian Black Sea fleet. Turkey was to retain her active army in consequence of continuation of war against the Entente.

Bulgaria took part with Germany, Austria, and Turkey in the first negotiations at Brest-Litovsk, and it has been assumed that no peace terms would be agreed to by the Central Powers except in concert. However, advices yesterday giving the names of those who took part in the first session of the Brest-Litovsk conferences when they were resumed this week made no mention of a Bulgarian representative.—*N. Y. Times,* 11/1.

INTERNAL CONDITIONS IN RUSSIA.—In December General Kaledine was re-elected leader of the Don Cossacks by a vote of 562 out of a total of 638. Reports to Petrograd from Kostov on January 10 announced the formation of the Republic of the Don with General Kaledine as President and Prime Minister. The territory included comprised more than 63,000 square miles in the Don basin in southeastern Russia. The purpose of General Kaledine was said to be not to fight the Bolsheviki but to end civil war.

According to Petrograd dispatches of January 6, the Rada, the Ukrainian legislative body, and the Bolsheviki had agreed to a compromise, by which the Ukraine agreed to withdraw support from General Kaledine and

his Cossacks in return for the removal of Bolshevist troops from Ukraine territory. Later reports stated that abundant food supplies had been secured for Petrograd through this settlement, the Ukraine agreeing to supply three billion pounds of bread within 60 days on payment half in cash and half in merchandise.

A Ukrainian delegate was admitted to the peace conference at Brest-Litovsk and submitted the following statement:

"The Ukrainian People's Republic brings the following to the knowledge of all belligerents and neutral states: The Central Rada, on November 20, proclaimed a People's Republic, and by this act an international status was determined. Striving for the creation of a confederation of all the republics which have arisen in the territory of the former Russian Empire, the Ukrainian People's Republic, through its General Secretariat, proceeds to enter into the independent relations pending the formation of a federal government in Russia and until the relations of the Ukraine with the future federation are established."

It was later announced that Germany and the Ukrainian Government had negotiated peace independently from the Bolshevist delegates.

FINLAND AND UKRAINE RECOGNIZED.—Germany announced, on January 6, that she recognized Finland as a republic. The Paris *Matin* stated on January 6 that France had recognized Finland as an independent state, and that a high commissioner had been sent to Kiev by the Allies to deal with the Ukraine. This action was taken "to assist each region to attain a form of government which in future shall assure the durable existence of the Russian federation."

CONSTITUENT ASSEMBLY DISSOLVED.—A Reuter's dispatch of January 20 stated that the Bolsheviki had dissolved the Constituent Assembly, which held its opening session January 18. At this session the anti-Bolshevik element succeeded in electing their candidate for chairman by a vote of 244 to 151. The Bolsheviki and extreme Social Revolutionists thereupon withdrew from the Assembly.

PEACE TERMS OF THE ALLIES.

PREMIER LLOYD GEORGE TO TRADES UNION CONFERENCE.—On January 5 Premier Lloyd George, speaking for the government and the nation before the Trades Union Conference in London, stated in the plainest language the essential peace terms demanded by the Allies.

Two weeks earlier, on December 20, the Premier had addressed the House of Commons on the same theme. In this earlier speech he made a favorable report on the shipping and submarine situation, stating that whereas available ship tonnage was "down about 20 per cent, imports had decreased in volume only 6 per cent." Reviewing the military situation, he called attention to successes in Palestine, the aid of America, and the difficulties created by the Russo-German armistice. He forecast further levies on man power, to be drawn from young men hitherto held in essential industries. Re-stating peace terms, he declared that Russia's interests were out of the hands of the Allies, and that German colonies would not be restored.

In the later speech, on January 5, following Count Czernin's statement of December 25 and the concrete terms presented to Russia, the Premier modified somewhat the position taken in his previous utterance. He first announced that he had consulted national leaders and representatives of overseas dominions, and could claim to speak "not merely the mind of the government, but of the nation and of the empire as a whole." He denied a war of aggression against Germany or a desire to disrupt the German state and declared that while a really democratic constitution in Germany would make it much easier to conclude peace, that, after all, was "a question for the German people to decide." He declared the terms offered by Count Czernin vague and deceitful, a device on the part of Germany to make territories nominally independent but actually under the political and economic domination of the Central Powers. He stated the essential conditions of a permanent peace as follows:

"The first requirement, therefore, always put forward by the British Government and their allies, has been the complete restoration, political, territorial, and economic, of independence of Belgium and such reparation as can be made for the devastation of its towns and provinces.

"This is no demand for a war indemnity, such as that imposed on France by Germany in 1871. It is not an attempt to shift the cost of war-like operations from one belligerent to another, which may or may not be defensible. It is no more and no less than an insistence that before there can be any hope for stable peace, this great breach of the public law of Europe must be repudiated and so far as possible repaired.

"Reparation means recognition. Unless international right is recognized by insistence on payment for injury, done in defiance of its canons, it can never be a reality.

Restoration of Alsace-Loraine.—"Next comes the restoration of Serbia, Montenegro, and the occupied parts of France, Italy, and Rumania. The complete withdrawal of the allied (Teutonic) armies, and the reparation for injustice done is a fundamental condition of permanent peace.

"We mean to stand by the French democracy to the death in the demand they make for a reconsideration of the great wrong of 1871, when, without any regard to the wishes of the population, two French provinces were torn from the side of France and incorporated in the German Empire.

"This sore has poisoned the peace of Europe for half a century, and, until it is cured, healthy conditions will not have been restored. There can be no better illustration of the folly and wickedness of using a transient military success to violate national right.

Russia and the Allies.—"I will not attempt to deal with the question of the Russian territories now in German occupation. The Russian policy since the revolution has passed so rapidly through so many phases that it is difficult to speak without some suspension of judgment as to what the situation will be when the final terms of European peace come to be discussed.

"Russia accepted war with all its horrors because, true to her traditional guardianship of the weaker communities of her race, she stepped in to protect Serbia from a plot against her independence. It is this honorable sacrifice which not merely brought Russia into the war, but France as well.

"France, true to the conditions of her treaty with Russia, stood by her ally in a quarrel which was not her own. Her chivalrous respect for her treaty led to the wanton invasion of Belgium and the treaty obligations of Great Britain to that little land brought us into the war.

"The present rulers of Russia are now engaged, without any reference to the countries whom Russia brought into the war, in separate negotia-

tions with their common enemy. I am indulging in no reproaches. I am merely stating the facts with a view to making it clear why Great Britain cannot be held accountable for decisions, taken in her absence, and concerning which she has not been consulted or her aid invoked.

Prussian Designs upon Russia.—"No one who knows Prussia and her designs upon Russia can for a moment doubt her ultimate intention. Whatever phrases she may use to delude Russia, she does not mean to surrender one of the fair provinces or cities of Russia now occupied by her forces. Under one name or another (and the name hardly matters) those Russian provinces will henceforth be in reality a part of the dominions of Prussia. They will be ruled by the Prussian sword in the interests of the Prussian autocracy, and the rest of the people of Russia will be partly enticed by specious phrases and partly bullied by the threat of continued war against an impotent army into a condition of complete economic and ultimate political enslavement to Germany.

"We all deplore the prospect. The democracy of this country means to stand to the last by the democracies of France and Italy and all our other allies. We shall be proud to stand side by side by the new democracy of Russia. So will America and so will France and Italy. But if the present rulers of Russia take action, which is independent of their allies, we have no means of intervening to arrest the catastrophe which is assuredly befalling their country. Russia can only be saved by her own people.

"We believe, however, that an independent Poland, comprising all those genuinely Polish elements who desire to form a part of it, is an urgent necessity for the stability of Western Europe.

"Similarly, though we agree with President Wilson that a break-up of Austria-Hungary is no part of our war aims, we feel that unless genuine self-government on true democratic principles is granted to those Austro-Hungarian nationalities who have long desired it, it is impossible to hope for a removal of those causes of unrest in that part of Europe which have so long threatened the general peace.

"On the same grounds we regard as vital the satisfaction of the legitimate claims of the Italians for union with those of their own race and tongue. We also mean to press that justice be done to the men of Rumanian blood and speech in their legitimate aspirations. If these conditions are fulfilled, Austria-Hungary would become a power whose strength would conduce to the permanent peace and freedom of Europe instead of being merely an instrument to the pernicious military autocracy of Prussia that uses the resources of its allies for the furtherance of its own sinister purposes.

Turks to Keep Constantinople.—"Outside of Europe we believe that the same principles should be applied. While we do not challenge the maintenance of the Turkish Empire in the homelands of the Turkish race with its capital at Constantinople, the passage between the Mediterranean and the Black Sea being internationalized and neutralized, Arabia, Armenia, Mesopotamia, Syria, and Palestine are, in our judgment, entitled to a recognition of their separate national conditions.

"What the exact form of that recognition in each particular case should be need not here be discussed beyond stating that it would be impossible to restore to their former sovereignty the territories to which I have already referred.

"Much has been said about the arrangements we have entered into with our allies on this and on other subjects. I can only say that as the new circumstances, like the Russian collapse and the separate negotiations, have changed the conditions under which those arrangements were made, we are, and always have been, perfectly ready to discuss them with our allies.

Colonies to Settle Own Future.—"With regard to the German colonies, I have repeatedly declared that they are held at the disposal of a conference whose decision must have primary regard to the wishes and interests of the native inhabitants of such colonies. None of those territories is in-

habited by Europeans. The governing consideration, therefore, must be that the inhabitants should be placed under the control of an administration acceptable to themselves, one of whose main purposes will be to prevent their exploitation for the benefit of European capitalists or governments.

"The natives live in their various tribal organizations under chiefs and councils who are competent to consult and speak for their tribes and members and thus to represent their wishes and interests in regard to their disposal. The general principle of national self-determination is, therefore as applicable in their cases as in those of the occupied European territories.

"The German declaration that the natives of the German colonies have through their military fidelity in war shown their attachment and resolve under all circumstances to remain with Germany is applicable, not to the German colonies generally, but only to one of them; and in that case, German East Africa, the German authorities secured the attachment, not of the native population as a whole, which is and remains profoundly anti-German, but only of a small warlike class, from whom their *askaris*, or soldiers, were selected. These they attached to themselves by conferring on them a highly privileged position, as against the bulk of the native population, which enabled these *askaris* to assume a lordly and oppressive superiority over the rest of the natives.

"By this and other means they secured the attachments of a very small and insignificant minority, whose interests were directly opposed to those of the rest of the population and for whom they have no right to speak. The German treatment of the native populations in their colonies has been such as amply to justify their fear of submitting the future of those colonies to the wishes of the natives themselves.

"Finally there must be reparation for the injuries done in violation of international law. The peace conference must not forget our seamen and the services they have rendered to and the outrages they have suffered for the common cause of freedom.

Must Have Permanent Settlement.—"One omission we notice in the proposal of the Central Powers which seems to us especially regrettable. It is desirable and essential that the settlement after this war shall be one which does not in itself bear the seed of future war. But that is not enough. However wisely and well we may make territorial and other arrangements, there will still be many subjects of international controversy. Some, indeed, are inevitable.

"Economic conditions at the end of the war will be in the highest degree difficult owing to the diversion of human effort to warlike pursuits. There must follow a world shortage of raw materials, which will increase the longer the war lasts, and it is inevitable that those countries which have control of raw materials will desire to help themselves and their friends first. Apart from this, whatever settlement is made will be suitable only to the circumstances under which it is made, and as those circumstances change, changes in the settlement will be called for.

"So long as the possibility of a dispute between nations continues—that is to say, so long as men and women are dominated by impassioned ambition and war is the only means of settling a dispute—all nations must live under a burden, not only of having from time to time to engage in it, but of being compelled to prepare for its possible outbreak.

"The crushing weight of modern armaments, the increasing evil of compulsory military service, the vast waste of wealth and effort involved in warlike preparation—these are blots on our civilization, of which every thinking individual must be ashamed. For these and other similar reasons we are confident that a great attempt must be made to establish, by some international organization, an alternative to war as a means of settling international disputes.

"After all, war is a relic of barbarism, and just as law has succeeded violence as a means of settling disputes between individuals, so we believe that it is destined ultimately to take the place of war in settlement of controversies between nations.

"If, then, we are asked what we are fighting for, we reply, as we have often replied, We are fighting for a just and lasting peace, and we believe that before permanent peace can be hoped for three conditions must be fulfilled: First, the sanctity of treaties must be re-established; secondly, a territorial settlement must be secured, based on the right of self-determination or the consent of the governed, and, lastly, we must seek, by the creation of some international organization, to limit the burden of armaments and diminish the probability of war. On these conditions its peoples are prepared to make even greater sacrifices than those they have yet endured."

PRESIDENT WILSON'S PEACE PROGRAM.—In a message received with enthusiasm by all the allied peoples and warmly approved by nations still neutral, President Wilson, on January 8, re-stated before Congress the aims of the allied nations in the war. The specific terms were summarized in the following 14 points:

1. Open covenants of peace without private international understandings.
2. Absolute freedom of the seas in peace or war, except as they may be closed by international action.
3. Removal of all economic barriers and establishment of equality of trade conditions among nations consenting to peace and associating themselves for its maintenance.
4. Guarantees for the reduction of armaments to the lowest point consistent with domestic safety.
5. Impartial adjustment of all colonial claims, based upon the principle that the peoples concerned have equal weight with the interest of the government.
6. Evacuation of all Russian territory and opportunity for Russia's political development.
7. Evacuation of Belgium without any attempt to limit her sovereignty.
8. All French territory to be freed and restored, and reparation for the taking of Alsace-Lorraine.
9. Readjustment of Italy's frontiers along clearly recognizable lines of nationality.
10. Freest opportunity for autonomous development of the peoples of Austria-Hungary.
11. Evacuation of Roumania, Serbia and Montenegro, with access to the sea for Serbia, and international guarantees of economic and political independence and territorial integrity of the Balkan States.
12. Secure sovereignty for Turkey's portion of the Ottoman Empire, but with other nationalities under Turkish rule assured security of life and opportunity for autonomous development, with the Dardanelles permanently opened to all nations.
13. Establishment of an independent Polish state, including territories inhabited by indisputably Polish populations, with free access to the sea, and political and economic independence and territorial integrity guaranteed by international covenant.
14. General association of nations under specific covenants for mutual guarantees of political independence and territorial integrity to large and small states alike.

The speech in full follows:

Gentlemen of the Congress:

Once more, as repeatedly before, the spokesmen of the Central Empires have indicated their desire to discuss the objects of the war and the possible basis of a general peace. Parleys have been in progress at Brest-Litovsk between Russian representatives and representatives of the Central Powers, to which the attention of all the belligerents has been invited for the purpose of ascertaining whether it may be possible to extend these parleys into a general conference with regard to terms of peace and settle-

ment. The Russian representatives presented not only a perfectly definite statement of the principles upon which they would be willing to conclude peace, but also an equally definite program of the concrete application of those principles. The representatives of the Central Powers, on their part, presented an outline of settlement which, if much less definite, seemed susceptible of liberal interpretation until their specific program of practical terms was added. That program proposed no concessions at all, either to the sovereignty of Russia or to the preferences of the population with whose fortunes it dealt, but meant, in a word, that the Central Empires were to keep every foot of territory their armed forces had occupied—every province, every city, every point of vantage—as a permanent addition to their territories and their power. It is a reasonable conjecture that the general principles of settlement which they at first suggested originated with the more liberal statesmen of Germany and Austria, the men who have begun to feel the force of their own peoples' thought and purpose, while the concrete terms of actual settlement came from the military leaders who have no thought but to keep what they have got. The negotiations have been broken off. The Russian representatives were sincere and in earnest. They cannot entertain such proposals of conquest and domination.

Full of Significance and Perplexity.—The whole incident is full of significance. It is also full of perplexity. With whom are the Russian representatives dealing? For whom are the representatives of the Central Empires speaking? Are they speaking for the majorities of their respective Parliaments or for the minority parties, that military and imperialistic minority which has so far dominated their whole policy and controlled the affairs of Turkey and of the Balkan States, which have felt obliged to become their associates in this war? The Russian representatives have insisted, very justly, very wisely, and in the true spirit of modern democracy that the conferences they have been holding with the Teutonic and Turkish statesmen should be held within open, not closed, doors, and all the world has been audience, as was desired. To whom have we been listening, then? To those who speak the spirit and intention of the resolutions of the German Reichstag of the 9th of July last, the spirit and intention of the liberal leaders and parties of Germany, or to those who resist and defy that spirit and intention and insist upon conquest and subjugation? Or are we listening, in fact, to both, unreconciled and in open and hopeless contradiction? These are very serious and pregnant questions. Upon the answer to them depends the peace of the world.

Re-Statement of Specific Aims.—But whatever the results of the parleys at Brest-Litovsk, whatever the confusions of counsel and of purpose in the utterances of the spokesmen of the Central Empires, they have again attempted to acquaint the world with their objects in the war and have again challenged their adversaries to say what their objects are and what sort of settlement they would deem just and satisfactory. There is no good reason why that challenge should not be responded to, and responded to with the utmost candor. We did not wait for it. Not once, but again and again we have laid our whole thought and purpose before the world, not in general terms only, but each time with sufficient definition to make it clear what sort of definite terms of settlement must necessarily spring out of them. Within the last week Mr. Lloyd George has spoken with admirable candor and in admirable spirit for the people and government of Great Britain. There is no confusion of counsel among the adversaries of the Central Powers, no uncertainty of principle, no vagueness of detail. The only secrecy of counsel, the only lack of fearless frankness, the only failure to make definite statement of the objects of the war, lies with Germany and her allies. The issues of life and death hang upon these definitions. No statesman who has the least conception of his responsibility ought for a moment to permit himself to continue this tragical and outpouring of blood and treasure unless he is sure beyond a peradventure that the objects of

the vital sacrifice are part and parcel of the very life of society and that the people for whom he speaks think them right and imperative as he does.

Response to Russia.—There is, moreover, a voice calling for these definitions of principle and of purpose which is, it seems to me, more thrilling and more compelling than any of the many moving voices with which the troubled air of the world is filled. It is the voice of the Russian people. They are prostrate and all but helpless, it would seem, before the grim power of Germany, which has hitherto known no relenting and no pity. Their power apparently is shattered. And yet their soul is not subservient. They will not yield either in principle or in action. Their conception of what is right, of what is humane and honorable for them to accept, has been stated with a frankness, a largeness of view, a generosity of spirit, and a universal human sympathy which must challenge the admiration of every friend of mankind; and they have refused to compound their ideals or desert others that they themselves may be safe. They call to us to say what it is that we desire, in what, if in anything, our purpose and our spirit differ from theirs; and I believe that the people of the United States would wish me to respond with utter simplicity and frankness. Whether their present leaders believe it or not, it is our heartfelt desire and hope that some way may be opened whereby we may be privileged to assist the people of Russia to attain their utmost hope of liberty and ordered peace.

No Secret Peace.—It will be our wish and purpose that the processes of peace, when they are begun, shall be absolutely open, and that they shall involve and permit henceforth no secret understandings of any kind. The day of conquest and aggrandizement is gone by; so is also the day of secret covenants entered into in the interest of particular governments and likely at some unlooked-for moment to upset the peace of the world. It is this happy fact, now clear to the view of every public man whose thoughts do not still linger in an age that is dead and gone, which makes it possible for every nation whose purposes are consistent with justice and the peace of the world to avow now or at any other time the objects it has in view.

We entered this war because violations of right had occurred which touched us to the quick and made the life of our own people impossible unless they were corrected and the world secured once for all against their recurrence. What we demand in this war, therefore, is nothing peculiar to ourselves. It is that the world be made fit and safe to live in; and particularly that it be made safe for every peace-loving nation which, like our own, wishes to live its own life, determine its own institutions, be assured of justice and fair dealings by the other peoples of the world, as against force and selfish aggression. All the people of the world are in effect partners in this interest and for our own part we see very clearly that unless justice be done to others it will not be done to us.

World's Peace Program.—The program of the world's peace, therefore, is our program, and that program, the only possible program, as we see it, is this:

I. Open covenants of peace, openly arrived at, after which there shall be no private international understandings of any kind, but diplomacy shall proceed always frankly and in the public view.

II. Absolute freedom of navigation upon the seas, outside territorial waters, alike in peace and in war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants.

III. The removal, so far as possible, of all economic barriers and the establishment of an equality of trade conditions among all the nations consenting to the peace and associating themselves for its maintenance.

IV. Adequate guarantees given and taken that national armaments will reduce to the lowest point consistent with domestic safety.

V. Free, open-minded, and absolutely impartial adjustment of all colonial claims, based upon a strict observance of the principle that in determining all such questions of sovereignty the interests of the population

concerned must have equal weight with the equitable claims of the government whose title is to be determined.

VI. The evacuation of all Russian territory and such a settlement of all questions affecting Russia as will secure the best and freest co-operation of the other nations of the world in obtaining for her an unhampered and unembarrased opportunity for the independent determination of her own political development and national policy, and assure her of a sincere welcome into the society of free nations under institutions of her own choosing; and, more than a welcome, assistance also of every kind that she may need and may herself desire. The treatment accorded Russia by her sister nations in the months to come will be the acid test of their good-will, of their comprehension of her needs as distinguished from their own interests, and their intelligent and unselfish sympathy.

VII. Belgium, the whole world will agree, must be evacuated and restored, without any attempt to limit the sovereignty which she enjoys in common with all other free nations. No other single act will serve as this will serve to restore confidence among the nations in the laws which they have themselves set and determined for the government of their relations with one another. Without this healing act the whole structure and validity of international law is forever impaired.

VIII. All French territory should be freed and the invaded portions restored, and the wrong done to France by Prussia in 1871 in the matter of Alsace-Lorraine, which has unsettled the peace of the world for nearly 50 years, should be righted, in order that peace may once more be made secure in the interest of all.

IX. A readjustment of the frontiers of Italy should be effected along clearly recognizable lines of nationality.

X. The peoples of Austria-Hungary, whose place among the nations we wish to see safeguarded and assured, should be accorded the freest opportunity of autonomous development.

XI. Roumania, Serbia, and Montenegro, should be evacuated; occupied territories restored; Serbia accorded free and secure access to the sea; and the relations of the several Balkan States to one another determined by friendly counsel along historically established lines of allegiance and nationality; and international guarantees of the political and economic independence and territorial integrity of the several Balkan States should be entered into.

XII. The Turkish portions of the present Ottoman Empire should be assured a secure sovereignty, but the other nationalities which are now under Turkish rule should be assured an undoubted security of life and an absolutely unmolested opportunity of autonomous development, and the Dardanelles should be permanently opened as a free passage to the ships and commerce of all nations under international guarantees.

XIII. An independent Polish State should be erected which should include the territories inhabited by indisputably Polish populations, which should be assured a free and secure access to the sea, and whose political and economic independence and territorial integrity should be guaranteed by international covenant.

XIV. A general association of nations must be formed under specific covenants for the purpose of affording mutual guarantees of political independence and territorial integrity to great and small states alike.

Stand Together to the End.—In regard to these essential rectifications of wrong and assertions of right, we feel ourselves to be intimate partners of all the governments and people associated together against the imperialists. We cannot be separated in interest or divided in purpose. We stand together until the end.

For such arrangements and covenants we are willing to fight and continue to fight until they are achieved; but only because we wish the right to prevail and desire a just and stable peace, such as can be secured only by removing the chief provocations to war, which this program does remove.

We have no jealousy of German greatness, and there is nothing in this program that impairs it. We grudge her no achievement or distinction of learning or of pacific enterprise such as have made her record very bright and very enviable. We do not wish to injure her or to block in any way her legitimate influence or power. We do not wish to fight her either with arms or with hostile arrangements of trade, if she is willing to associate herself with us and the other peace-loving nations of the world in covenants of justice and law and fair dealing. We wish her only to accept a place of equality among the peoples of the world—the new world in which we now live—instead of a place of mastery.

Neither do we presume to suggest to her any alteration or modification of her institutions. But it is necessary, we must frankly say, and necessary as a preliminary to any intelligent dealings with her on our part, that we should know whom her spokesmen speak for when they speak to us, whether for the Reichstag majority or for the military party and the men whose creed is imperial domination.

We have spoken now, surely, in terms too concrete to admit of any further doubt or question. An evident principle runs through the whole program I have outlined. It is the principle of justice to all people and nationalities, and their right to live on equal terms of liberty and safety with one another, whether they be strong or weak. Unless this principle be made its foundation, no part of the structure of international justice can stand. The people of the United States could act upon no other principle, and to the vindication of this principle they are ready to devote their lives, their honor, and everything that they possess. The moral climax of this, the culminating and final war for human liberty, has come, and they are ready to put their own strength, their own highest purpose, their own integrity and devotion to the test.

UNITED STATES

GOVERNMENT CONTROL OF RAILROADS.—On December 26 President Wilson issued a proclamation declaring that on December 28 the government would take possession and assume control "of each and every system of transportation and the appurtenances thereof located wholly or in part within the boundaries of the continental United States, and consisting of railroads, and owned or controlled systems of coastwise and inland transportation, engaged in general transportation." This action did not include street and so-called interurban lines. Control of the railroads was vested in the Secretary of the Treasury, Mr. McAdoo, who was appointed Director General of Railroads. The President stated that he would recommend to Congress a guaranteed income to the railroads based on the average of their net profits during the three years ending June 30, 1917. This was estimated to represent an average profit of 5.32 per cent.

COAL SHORTAGE FORCES NATIONAL SHUT-DOWN.—On January 17 Fuel Admnistrator H. A. Garfield issued a proclamation ordering that all industries (with certain exceptions named by War and Navy departments), all professional offices (except physicians, dentists, and government officials), all stores and business buildings, should use no fuel, save sufficient to prevent freezing, on January 18, 19, 20, 21 and 22, and on each Monday following up to and including March 25. The order included all states east of the Mississippi and also Minnesota and Louisiana. The purpose of the order was to save fuel and at the same time lessen the burden of freight on the railroads.

GERMANY

PRUSSIAN REFORM BILLS.—Three reform bills have been introduced in the Prussian lower house. They are summarized as follows in the *Frankfurter Zeitung*:

"The first bill regulates the Prussian franchise as follows: Every Prussian subject who has been such for at least three years, has resided in the same parish at least one year, and is at least 25 years of age, will be entitled to vote. Each elector will have one vote and all elections will be by secret ballot. In cases where no candidate obtains an absolute majority, a second ballot will be necessary. The bill also provides for the redistribution of seats, giving a slight increase to the number of representatives in the larger towns.

"The second bill modifies the right of the Prussian Herrenhaus as regards the control of finances. Whereas, heretofore, the Herrenhaus could adopt or reject a budget *en bloc*, now the bill provides that henceforth a budget may be discussed in detail and single clauses amended.

"The third bill deals with the reform of the Herrenhaus and proposes that it shall be thus composed: Ten representatives of the princely houses, 24 from the princes and counts, 26 from the remainder of the hereditary nobility, 36 burgomasters, 36 great land-owners, 36 representatives of commerce and industry, 76 from local governing bodies, both municipal and rural, 36 from agriculture, 36 from trades, 12 from the artisan class, 16 from the universities, and 16 ecclesiastics, while the Kaiser, as King of Prussia, will nominate 150 other peers, making a total of 510 representatives."

While apparently introducing a favorable extension of the franchise, the first bill has been criticized by the German Socialist press on the ground that it needlessly increases the age limit and restricts the labor vote by long residence requirements.

The bills reconstructing the Upper House, while increasing the representation of the cities and the moneyed classes, leave that body safely under the control of the Emperor and nobility; and at the same time the Upper House is given a greatly increased power over financial measures. "In future," according to the *Westminster Gazette*, "it will be able to reverse the decision of the Lower House upon any particular vote, while the government will have power to proceed with the expenditure of money, even if the budget is not voted."

SOUTH AMERICA

ADDITIONAL LUXBURG DISPATCHES.—On December 20, Secretary Lansing, acting in concert with the Argentina Foreign Office, published 38 further dispatches between the German chargé at Buenos Aires and the Berlin Foreign Office, covering the period from July 7 to September 1, 1917, and dealing chiefly with negotiations in the *Toro* case and German intrigues in South America. The notes indicate that Count Luxburg regarded President Irgoyen of Argentina as favorably disposed, and sought through him to maintain a favorable attitude on the part of Argentina, Chili, and Bolivia. The notes are similar in tone to those published on September 8 and October 30, and contain little additional information.

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"Under Fire (Le Feu), The Story of a Squad." By Henri Barbusse. Translated by Fitzwater Wray. $1.50. (New York: E. P. Dutton & Co.)

There is already such a flood of personal memoirs of the great war that it is necessary to sort out the distinctive from the commonplace. One cannot read everything, even among war books. Everyone would agree, probably, that Empey's "Over the Top" stands high among the distinctive books, and there can be no question but that "Under Fire" belongs with it. In its French version, "Under Fire" received the prize awarded by the Académie Goncourt for the best book published in France last year. This verdict of approval by the critics has been confirmed by immediate popularity both in France and in America. Over 300,000 copies have been sold in France, and in its English version it has already run through nine editions since last August.

In one sense "Over the Top" and "Under Fire" are alike; both describe the life of the private in the trenches. In both we have the dug-out, the advance post, the firing platform, the vermin, the mud, the charge and countercharge. But the two books differ in tone as the authors differ in personality. Empey, an adventurous young American, tells his story with a lively sense of humor, much as a college boy might give an account of a vacation in the woods. After all, it was a big adventure, with many thrills and not a little fun. But M. Barbusse looks on the war through the eyes of maturity and reflection. He is an "intellectual," who stands in the bloody slime of the trenches with too poignant a sense of the horrors about him to feel any of the thrills of the younger man, or to share in his laughter. To the author of "Under Fire" this war is simply the most hideous tragedy the world ever saw.

The striking feature of this book is its vivid realism. Soldiers have complained that the correspondents have sent home only a washed and dressed image of the war. There can be no such complaint here. M. Barbusse takes pains to present the thing in its stark and horrible nakedness; consequently it is not the book for fastidious nerves. The author tries to give faithfully the life of his squad exactly as it is, in trench, rest billet, or dressing station. It appears that under the conditions of war these men come to have the same point of view toward everything, no matter from what part of France or what rank of society they came from. They bear no malice toward the Boche soldier, but always speak of the Boche officer as a kind of vermin. As for themselves they have ceased to hope; they merely endure. The one overmastering hatred that they all share is directed toward those in high places who have brought this war to pass.

The concluding chapter, "The Dawn," depicts a scene as impressive and as horrible as any circle of the Inferno. A group of soldiers, one of them

dying of his wound, lie mired in the Flanders plain, waiting for the dawn. As they lie there, half buried in the slime and surrounded by corpses, they talk on the war and its purposes; and they reach the conclusion that, after all, the real object of this war is to end war forever. This clearly is the object of the book itself. Certainly no one has ever written as terrible an indictment of what is called the "glory of war." W. O. S.

"Radio Communication." By John Mills, Research Department, Western Electric Company, Inc., Mem. Inst. Radio Eng., A. I. E. E., American Physical Society. 203 pages, 5 x 7½, illustrated. Price $1.75. (New York City: McGraw-Hill Book Co.)

The advances in engineering are usually about a year old before they receive publicity in the current periodical literature. Before appearing in book form they may be anywhere from two to five years old. The present book is an exception to this statement, for in most respects it is very much up to date. As a consequence of this early appearance in book form, not all the errors have had time to be eliminated, occasional paragraphs are without proper headings, and the transition matter between subjects is not always entirely adequate.

The book might well be called "Notes" on Radio Communication. The notes on the Vacuum Tube as a Detector, the Vacuum Tube as an Oscillator, the Vacuum Tube as an Amplifier, the Telephone Receiver, and Circuits of More than One Degree of Freedom are excellent. Many of the notes are gems of clear explanation, with the possible exception of that on the Arc Generator.

This is not an elementary book from the point of view of either mathematics or of radio. To those who have done some previous reading in Radio, for example as in (a) Chapters 26, 27, and 28 of Volume I of Bullard's "Naval Electricians' Text Book," 1915 Edition, or in (b) Chapters 23, 24, and 25 of Volume I of the 1917 Edition of the same book, or in (c) Robison's "Manual of Wireless Telegraphy," or in (d) G. W. Pierce's "Principles of Wireless Telegraphy," then this book will be a very valuable supplement. The mathematical training of a graduate of the U. S. Naval Academy or of a technical school will be sufficient preparation for reading this book. The novel handling of the mathematics applicable to radio will be found very helpful. In many cases the mathematics has been very cleverly simplified. The book, however, cannot be called non-mathematical.

The Appendix, dealing with Transmission Over Wire Circuits, is of interest primarily in the transmission of speech over very long distance telephone lines.

The Problems with answers and solutions at the end of the book form a helpful adjunct to the text.

Summing up it may be said that although this set of notes was hurriedly put in print, it contains both mathematical and radio notes which should be of the greatest help to the student of radio engineering. The diagrams and problems are excellent. On the whole this is a most welcome and timely book. L. A. D.

"Internal Combustion Engine Manual." By F. W. Sterling, Lieut. Comdr., U. S. Navy (Retired). 163 pages, 93 illustrations. Index of 3½ pages.

The manual has been written and revised to meet the needs of the course in marine engineering at the U. S. Naval Academy. This is the fourth edition of this book, which has now been used for eight years as a text book at the Naval Academy. The subjects of the several chapters are: Fuels; Construction; Types; Cycles, etc.; Carburetion; Ignition; Cooling and Lubrication; Governing and Indicator Cards; Operation, Troubles, and Remedies; Gasolene, Kerosene, and Alcohol Engines; Aerial Motors; The Diesel Engine. Included in the text are descriptions of the following U. S. Navy types: Gasolene engine, Diesel engines, and the Standard submarine chaser engine.

This book has been accepted by the U. S. Naval Service for the use of the student and the operator of the internal combustion engine, and is valuable in that it treats fully of the fundamentals of the subject as well as giving practical details of construction and directions for operation and upkeep.

G. J. M.

"The Journal of Submarine Commander Von Forstner," Translated by Mrs. Russell Codman. $1.00 net. (Houghton, Mifflin Company.)

It is unfortunate that no author has yet given us a personal narrative of the activities of any navy in this war that can compare with Ian Hay's "First Hundred Thousand," or Empey's "Over the Top." The censorship has effectually limited the output of personal narratives by naval officers of our allies, and the books that have come from German sources, with the exception of the stories of the *Emden* and *Ayesha,* have been all too evidently a part of the German propaganda and intended wholly for home consumption. This "Journal of Submarine Commander Von Forstner" is interesting and admirably translated, but fails to tell us any more of the life and activities of the submarine flotilla than the reader can get from the quotations from German newspapers that find their way to this country. It is obviously intended for Teutonic readers and was published, originally, to justify the submarine warfare on commerce and to convince the German people that the U-boat operations would soon lead to victory.

Von Forstner describes briefly life aboard a submarine, how it is submerged and how its operations are conducted; he tells of several cruises made by the boat under his command during the period before "sinking without warning" became the policy of his Almighty War Lord. The journal must have been published in Germany before unrestricted submarine warfare became effective, because there is none of the usual German attempt at justification of this practice. John Hays Hammond, Jr., wrote the introduction in which he discusses the operations of the submarines and the practicable methods of restricting their activities.

As one of the books on the war, Von Forstner's Journal has its place in the library of the student of current history; after the war, when the censorship is lifted and the whole truth can be told, it will be interesting to note how little books like this one really told us of history while it was being made.

P. P. B.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fifth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, $3.00; enlisted men, U. S. Navy, $2.50. Single copies, by purchase, 30 cents; issues preceding January, 1918, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1919

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All essays published in the PROCEEDINGS during 1918, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1919, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1918. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1918 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. Essays are limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

6. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

G. M. RAVENSCROFT,
Lieut. Commander, U. S. N., Secretary and Treasurer.

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC, PACIFIC AND ASIATIC FLEETS.

"The Mutual Relations of Gunnery and Tactics."

"The Place of the Naval Officer in International Affairs."

"The Evolution of Naval Doctrine from National Character."

"The Training of Enlisted Personnel to Produce Modern Man-o'-Warsmen: (a) Military Training; (b) Moral Training; (c) Education."

"The Organization, Employment and Training of Reserve Fleets and Flotillas."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut. Commander Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

Gunnery in Our Navy. The Causes of Its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure Its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut. Commander A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A Few Thoughts on Our Next Step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut. Commander Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

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THE NATION'S DEFENCE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut. Commander Yates Stirling, U. S. N.

1909

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

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WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

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1914

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